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- Lighting in the paper industry
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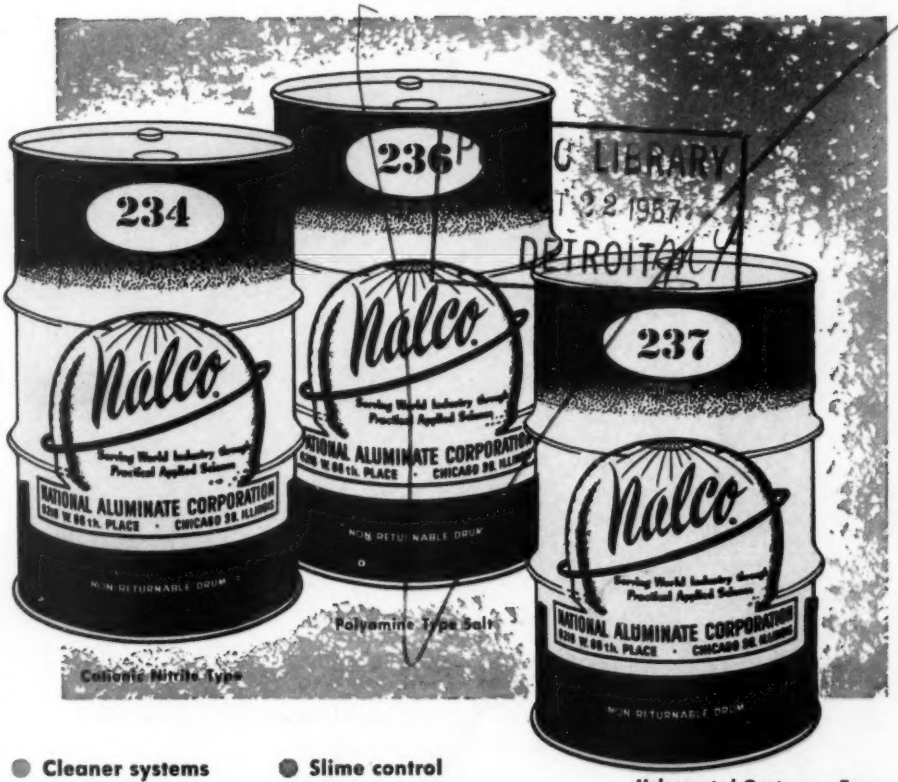

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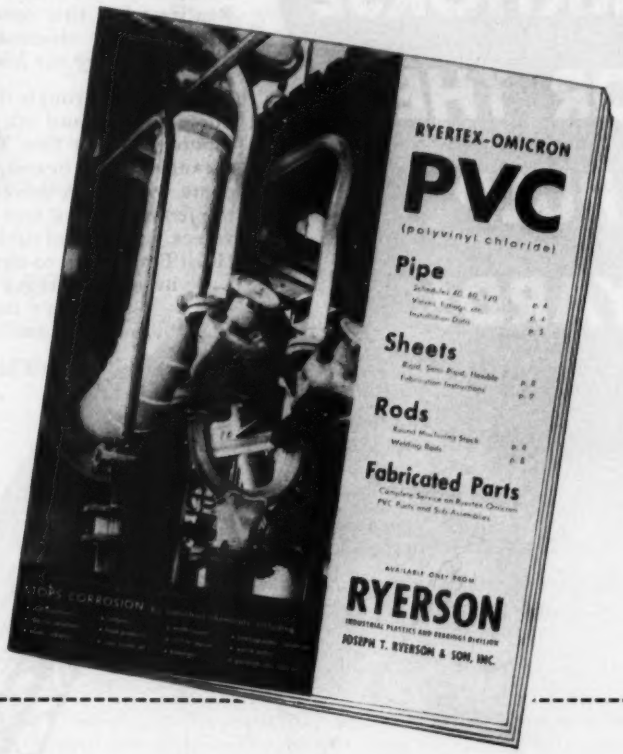

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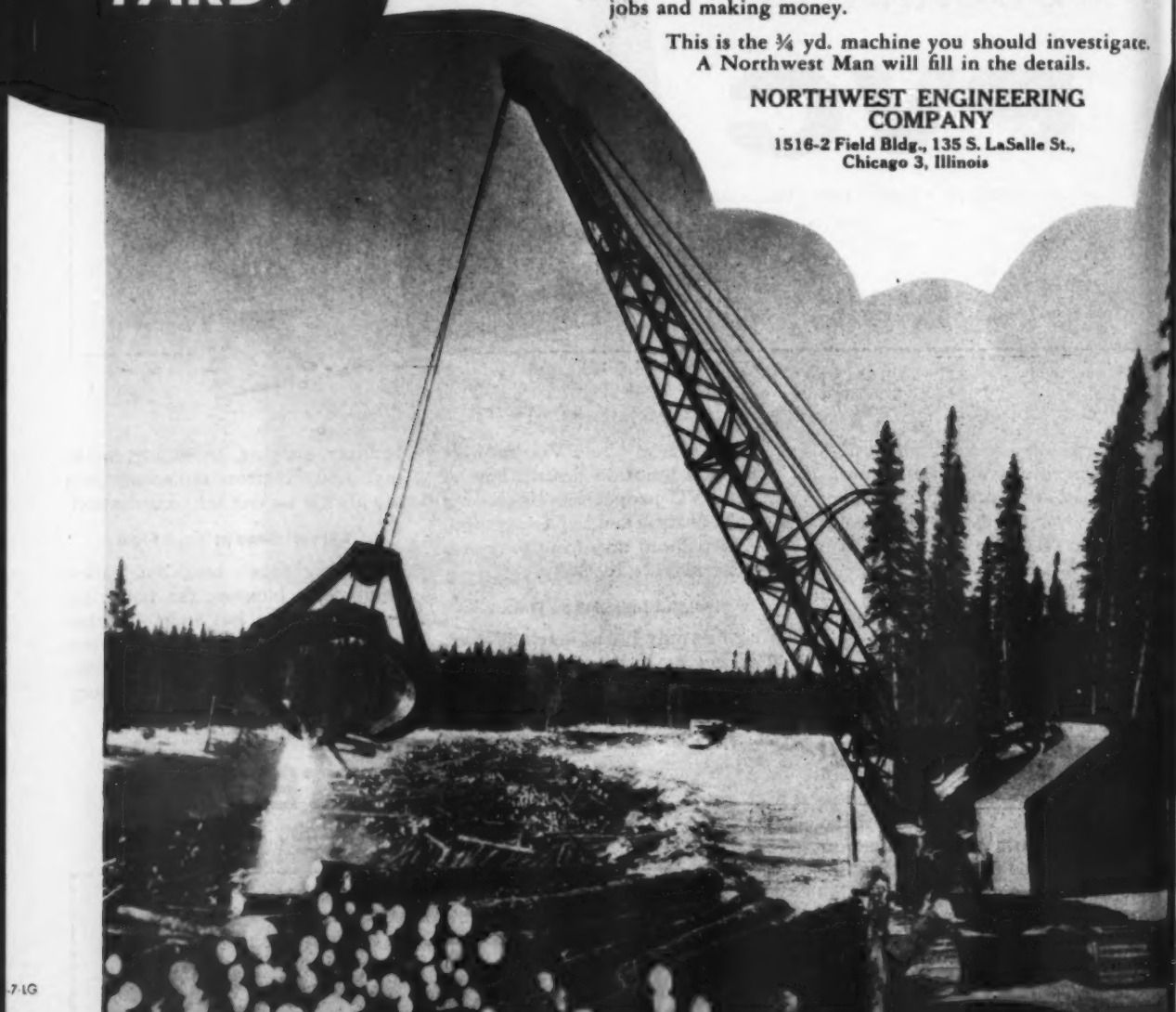

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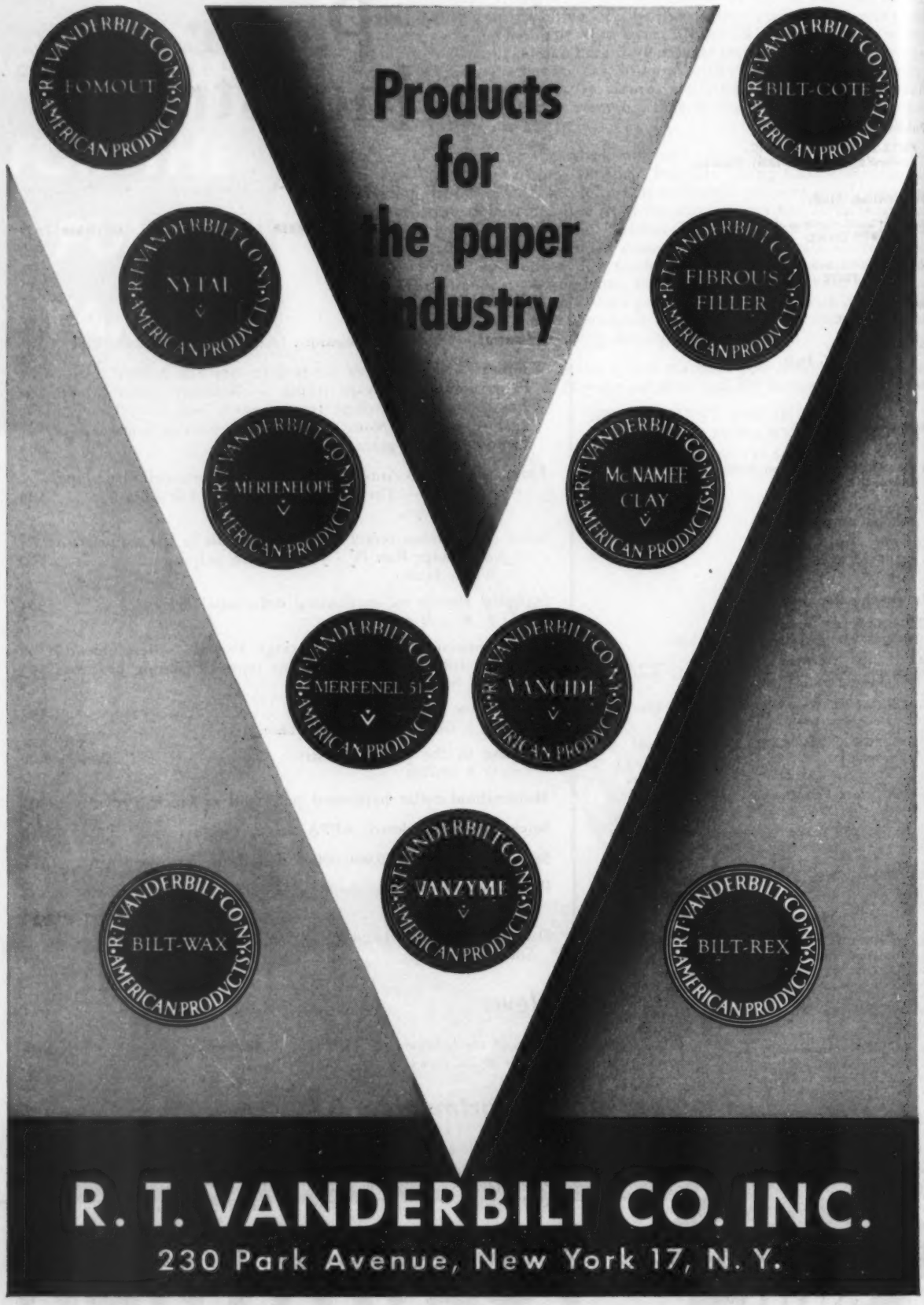
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From our point of view . .

Industrial relations face greater responsibilities

Labor-management relations are bound to attain greater prominence in the coming years. This follows clearly from the realization — as also pointed out by W. H. McFeely, vice president of Riegel Paper Corp., in a speech before the NPTA — that industry's management must by necessity if not by nature, be as concerned with the well-being of its employees as any social group including those who direct the labor unions. Ironic as it may seem, recent disclosures have shown that some of those who are directing the labor unions have shown nothing but contempt for the interests of those with whose well-being they are entrusted.

To quote from McFeely's speech, "the identification with the labor movement does not automatically endow a person with a sensitive concern for the individual or with a social conscience".

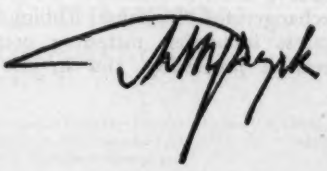
Management cannot afford to neglect the well-being of its employees for the simple reason that the company's profits, survival and perpetuity depend to a large extent on the leadership it provides in its harmonious relationship with labor. No one knows better than management that the company's first requirement is a well-trained, enlightened and satisfied labor force.

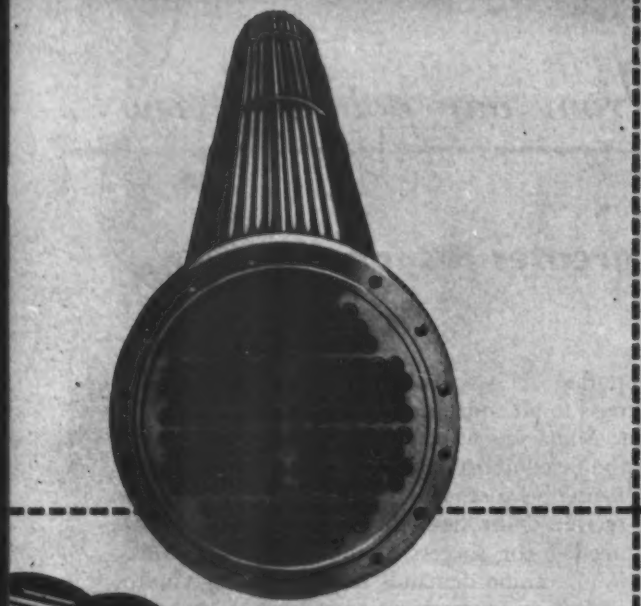
No one but management is better qualified to know what its obligations are toward a productive labor force, how it can reconcile these with the company's competitive position and with the company's objectives of profitability and survival. Management will have a tremendous advantage in its approach to labor relations if it implements these corporate obligations decisively and with a fairness to all concerned.

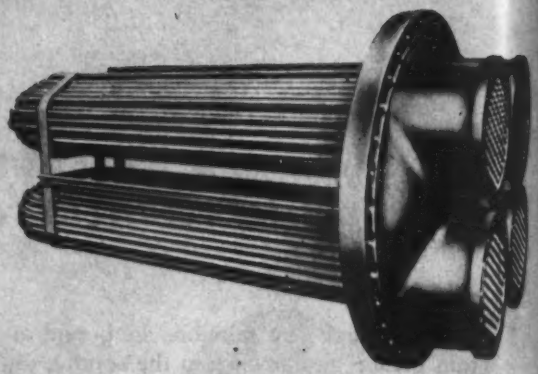
Management cannot afford to surrender the freedom to manage the affairs of its company, because with such surrender is also sacrificed the flexibility and maneuverability needed for successful industrial operations. While union demands seem to infringe more and more on management's right to manage, the ability to retain a major degree of freedom of action will depend in considerable measure on the initiative management will take in its labor relations.

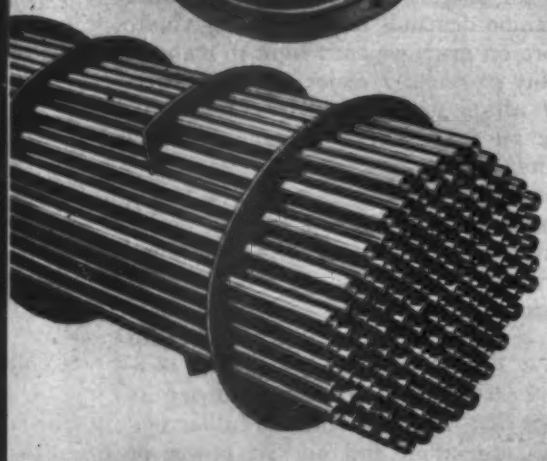
In the very near future we shall be facing the impact automation and nuclear power will have on employment, training, wages, safety, working hours, etc. It is in this area where industrial relations will face their greatest challenge. For it is essential, and for the good of all concerned, that the technological changes and their accompanying innovations that will come with the full acceptance of automation and nuclear power be implemented gradually. A maximum of planning, foresight and understanding will be needed to steer clear of unnecessary social unrest. We fully believe that the quality of foresight and understanding needed is an attribute of good industrial management rather than of union leadership, no matter how enlightened the latter may be.

Successful labor relations are essential for management in order to retain its initiative. It may mean winning half the battle in the ever-intensified struggle for the coveted prize of retaining industry control.

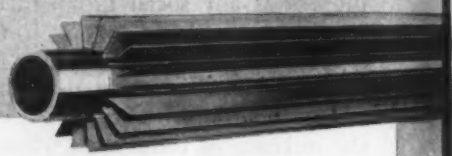






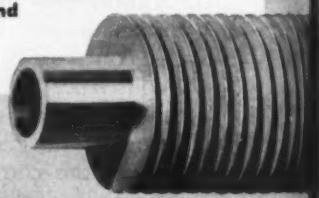


TWO GOOD WAYS TO ADD ADDITIONAL HEAT TRANSFER SURFACE AREA TO B&W CARBON STEEL ERW TUBES



(A) Longitudinal Channels Welded On

(B) Continuous Helical Fin Wound Around Tube and Welded On



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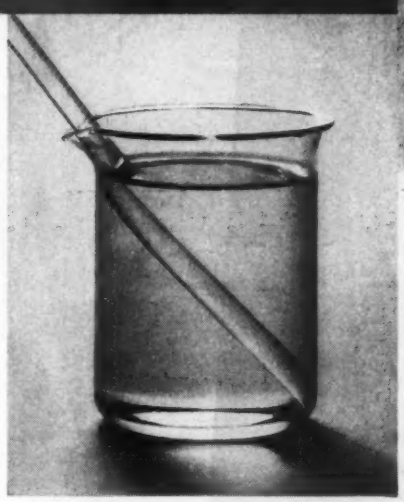

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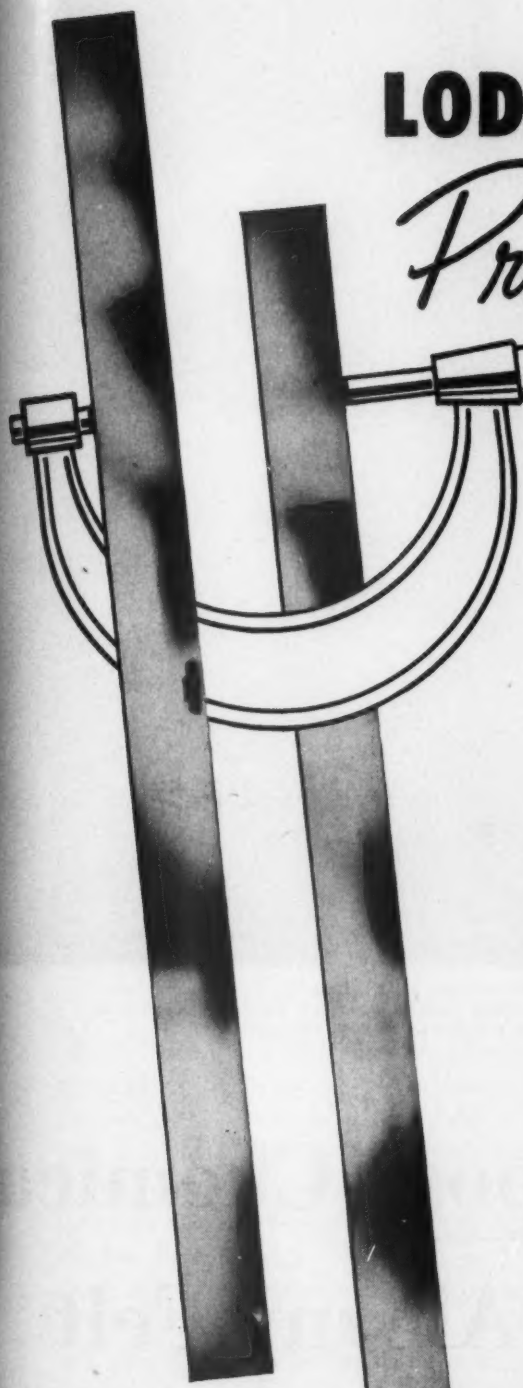

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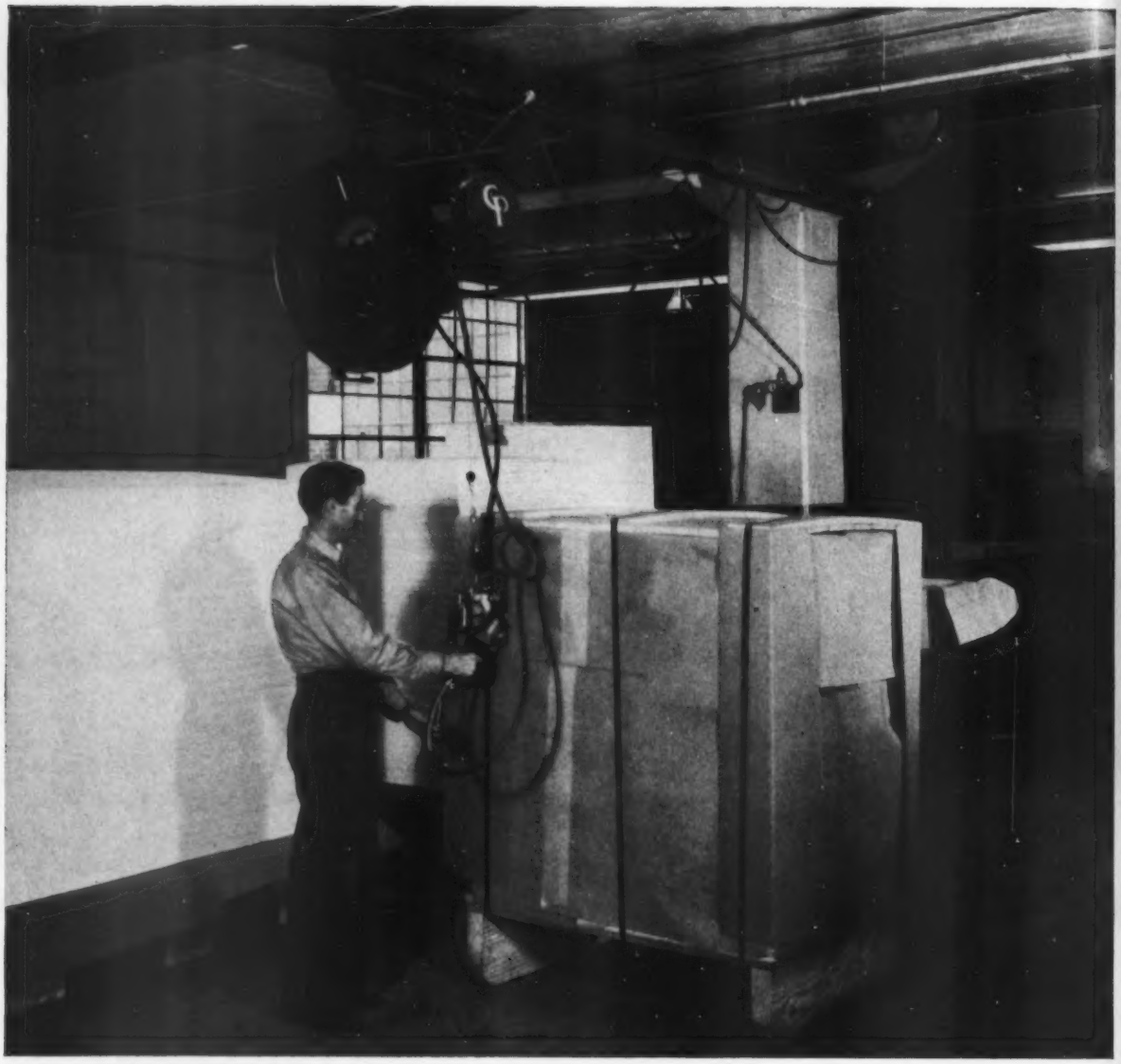

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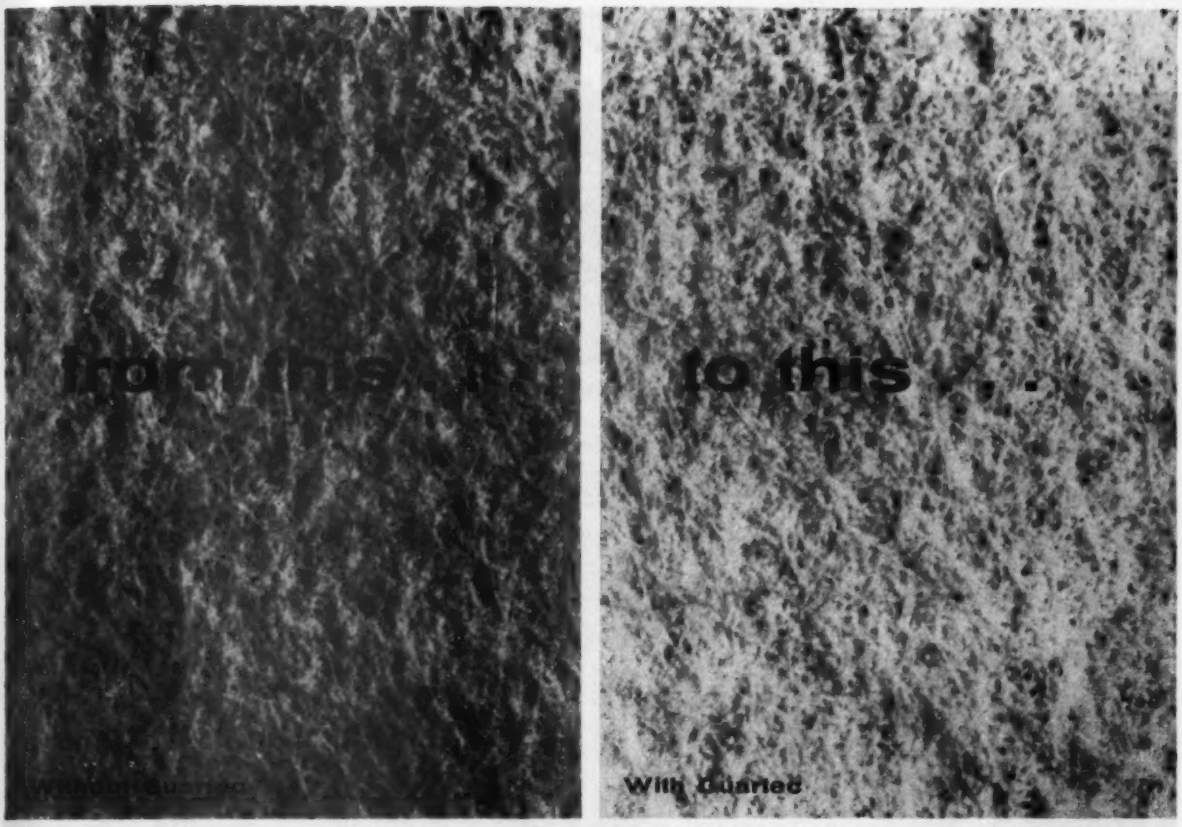

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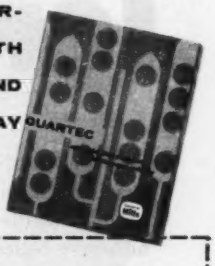

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Please send new booklet describing the opportunities in paper making with Guartec

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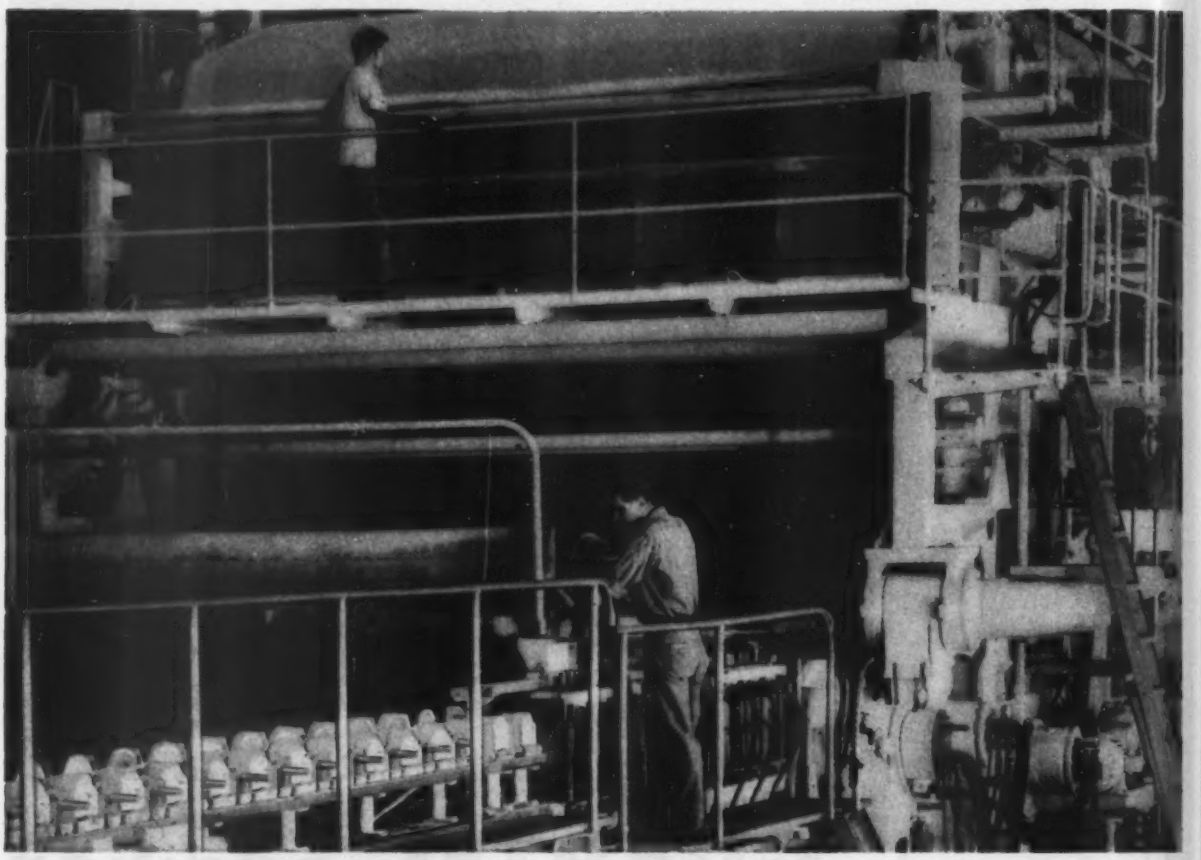
C.P. Starches...Try 'em for Size



FOR COATING ADHESIVES USE Ten-O-Film® STARCHES

Are you getting the kind of performance you want from your coating adhesives? Do they have satisfactory viscosity stability at high solids—and give good adhesive performance at lower adhesive concentrations?

For a real solution to such problems, it will pay you to investigate the new, improved Ten-O-Film starches.

Made in a series of viscosities to meet your exact requirements, these new starches have unexcelled color, clarity, uniformity and film forming properties. They possess a new high degree of viscosity stability, thereby reducing setback and maintaining adhesive strength.

For detailed information and assistance on specific problems consult with our nearest sales office, or write to:

CORN PRODUCTS SALES COMPANY
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Corn Products makes these famous products for the Paper Industry:

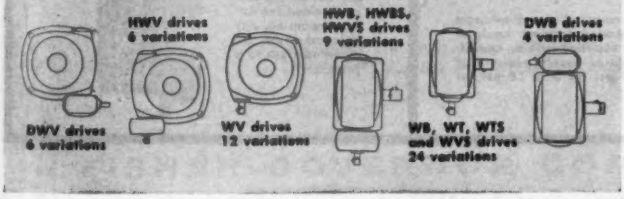
EAGLE® • FOXHEAD® • GLOBE® • HERCULES • TEN-O-FILM® Starches • GLOBE® Dextrines and Gums

If it's a high torque/ratio drive calling for right angle takeoff . . . it's a spot for a LINK-BELT Worm Gear Drive

Come to LINK-BELT for the best possible ratio/torque selection from industry's most comprehensive line

Name your speed reduction need. Up to 124,000 pound-inches torque . . . ratios from 3.1:1 to 8000:1 — you can meet all conditions perfectly from the broad line of Link-Belt Worm Gear Drives. Selection is simple with Book 2324-A. Ask your Link-Belt office or authorized stock-carrying distributor.

6 of 61 possible shaft arrangements using LINK-BELT Worm Gear Drives



LINK-BELT

ENCLOSED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.083

Any of the Wizard controllers can be yoke mounted on a diaphragm control valve to make a compact pilot operated pressure regulator as shown above. All Wizards are normally supplied with an operating medium air set which filters and reduces supply pressure of 25 to 250 psi to constant pressure of 20 psi for 3 to 15 psi, or 35 psi for 6 to 30 psi operation.

SURFACE MOUNTING

The Wizard can be mounted on the surface of a wall or any stable surface. A special mounting bracket is provided and any type of screw or bolt suitable for the mounting surface may be used.

FLUSH MOUNTING

By turning the bracket around that is provided for surface mounting, any Wizard can be mounted flush to a panel.

WORLD LEADER IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

For closer control in today's

more complex processing industries

FISHER®

WIZARD II

PRESSURE CONTROLLER

For over a quarter century, the name "Wizard" has become a byword as the pressure controller that is accurate, dependable and simple to operate in all types of industry.

Now, the WIZARD II takes over to meet the demands of modern, complex control systems requiring closer control. The WIZARD II retains all of the basic simplicity, accuracy and dependability of the Wizard 4100U, plus a number of new components. The WIZARD II is in a waterproof aluminum die-cast case and cover with ¼" tapped vent for gas service. With the addition of a few parts, the basic proportional controller can be converted to: (1) two-position action or "Snap Action", (2) pressure transmitter, (3) controller with remote set adjustment, (4) proportional plus reset response. The WIZARD II can be changed from direct to reverse action or vice versa without additional parts.

The superior subassembly construction stresses simplicity and compactness. Each subassembly is assembled and calibrated prior to mounting in the case. All Series 4150 Wizards can be supplied for remote set adjustment for changing the pressure setting from a location away from the Wizard controller.

Careful and exhaustive tests have conclusively proved that the WIZARD II measures up to the rigid Fisher standards.

A completely descriptive and illustrated bulletin on the WIZARD II is yours for the asking. Write today for Bulletin No. D-4150.

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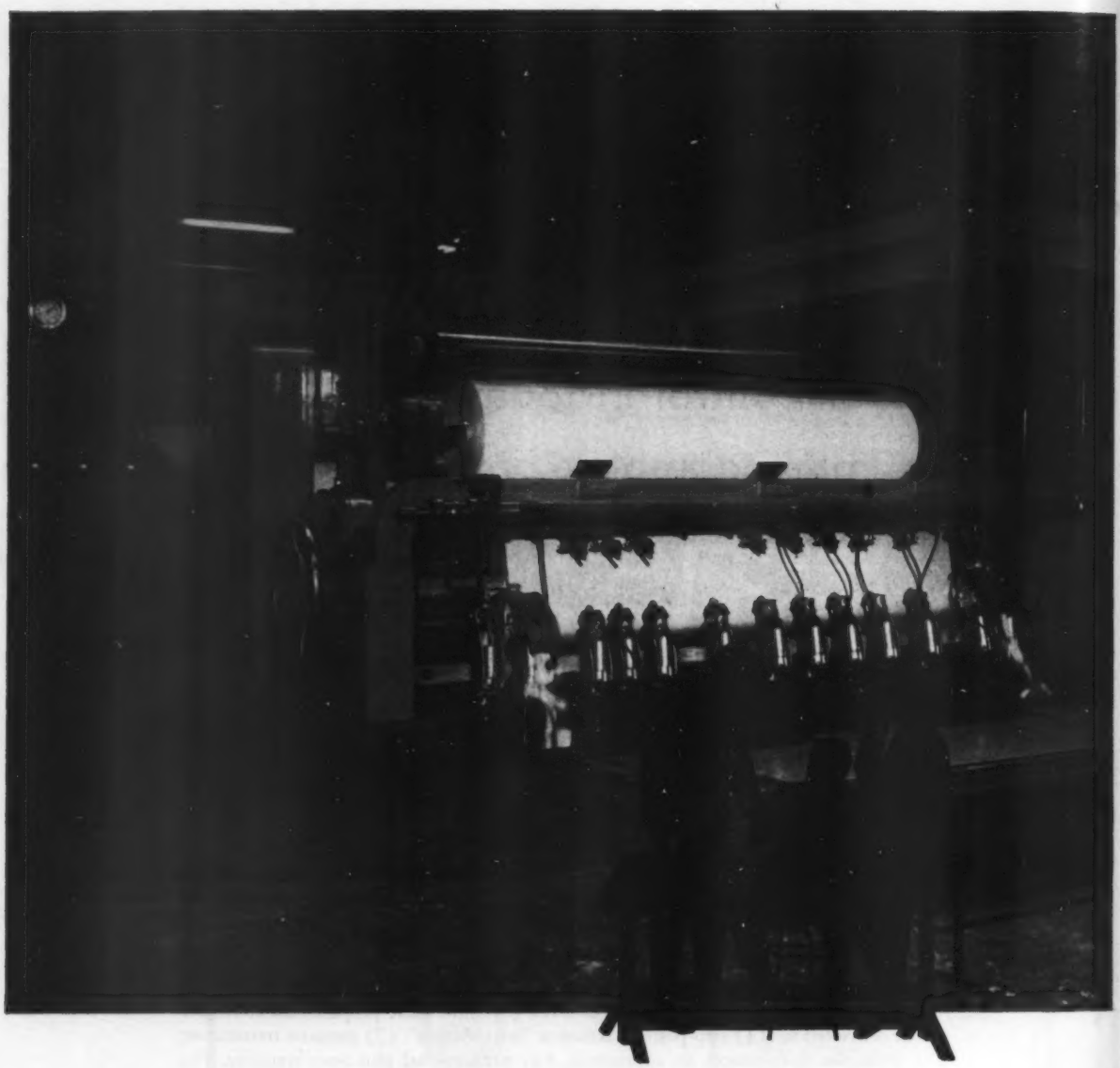

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Vibration-free operation . . . accurate, uniform slitting and winding of converter rolls . . . automatic controls for efficient performance! Rigid requirements to meet, so the Appleton Machine Company was selected to do the job.

And from Appleton's experienced design and production staff comes the most compact, low contour "push-button" winder available. The entire operation of this precision winder is pre-set. It requires only minimum attention by the operator. Custom-designed, custom-built, of course!

Ask your Appleton representative about the unusually efficient performance of this "push-button" winder with low center of gravity next time he calls.

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THE NEEDS OF THE PAPER INDUSTRY

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for paper that "talks" quality use *Clinton*® starches

That's it — rattle it, crease it, check it for uniformity — that's what your customer is going to do. He'll be as satisfied as you, too — when Clinton starches are used for sizing and coating. Clinton's enzyme conversion starches PM 3011 and PM 3021 give your paper the added strength and improved surface required for good printability. They convert well at high solids levels; they give efficient coating from application to drying.

For paper products that speak well of your mill, a good word to know is Clinton. Clinton starches and dextrins.

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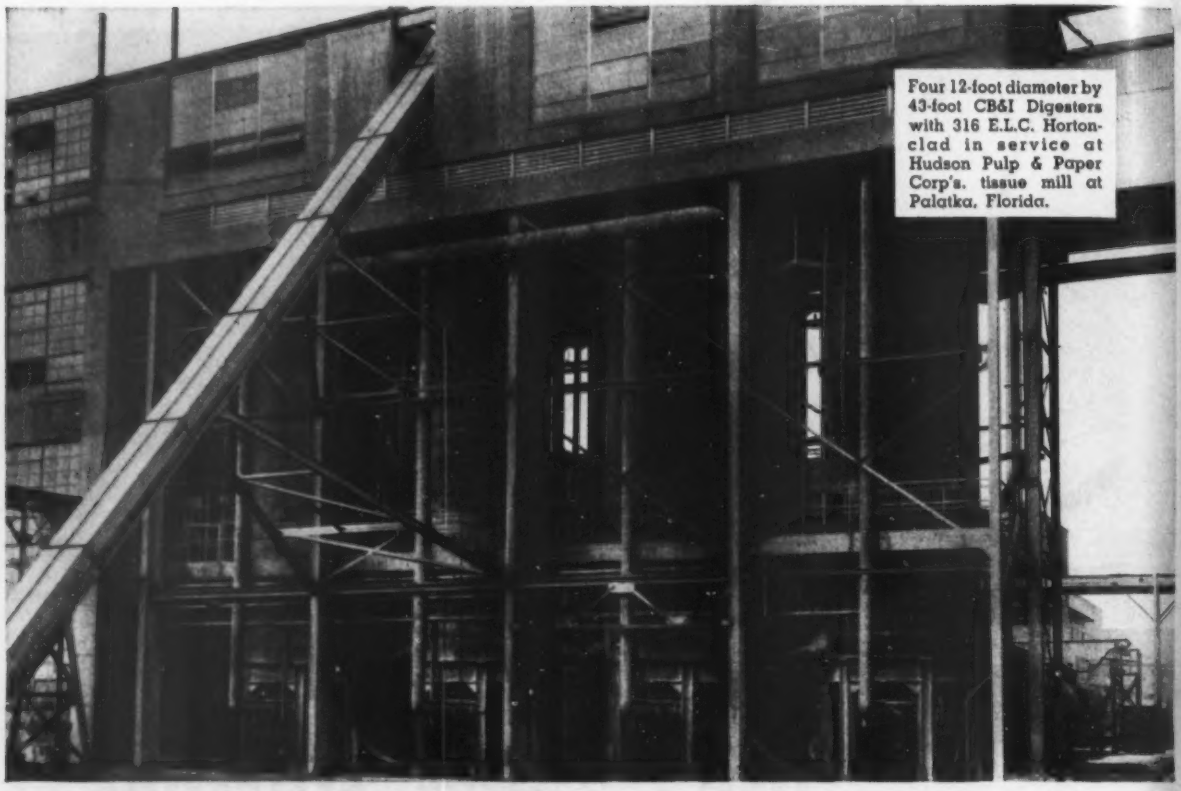

Four 12-foot diameter by 43-foot CB&I Digesters with 316 E.L.C. Hortonclad in service at Hudson Pulp & Paper Corp's. tissue mill at Palatka, Florida.

HORTONCLAD®

better corrosion protection for clad vessels with high vacuum brazing process

These benefits with HORTONCLAD® . . .
• UNIFORM THICKNESS
• HIGH STRENGTH BOND
• CLEAN, CONTAMINANT–FREE SURFACE
• ADAPTABILITY TO ANY SIZE OR SHAPE

Hortonclad, available only in CB&I tanks, pressure vessels and other clad structures, is unlike other clad materials. The bond is accomplished by a flux-free high vacuum brazing process producing a clad plate with an integral and continuous bond of high strength. Uniform clad thickness results as both alloy cladding and backing are in their final thickness *before* bonding. Silver, stainless steels (both chromium and chromium nickel) nickel, and high nickel alloys such as Monel, Inconel, and Hastelloys B and F can be employed in the Hortonclad process.

In corrosive service, Hortonclad permits the use of higher temperatures, concentration and pressures —without the high cost of solid alloy vessels. For further information on its application, write our nearest office . . . ask for the *Hortonclad* bulletin.

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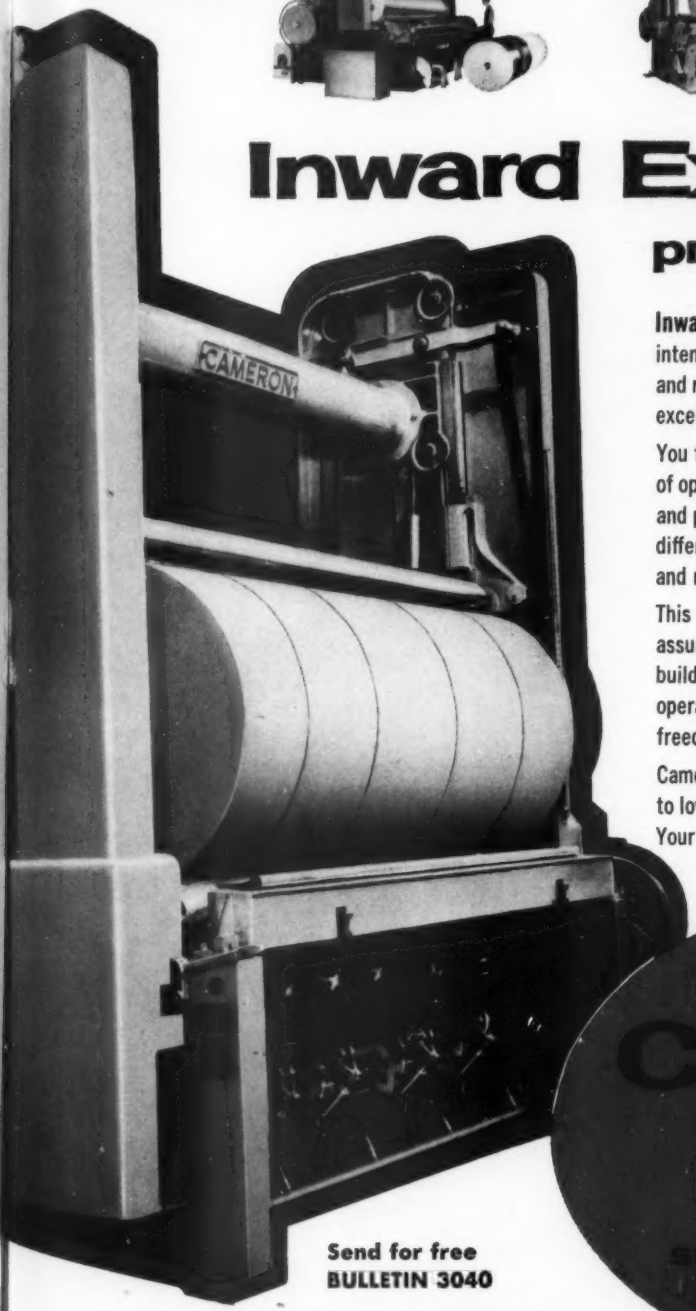
PP-20

CAMERON IMPERIAL ▸▸▸▸▸▸▸460 ▸▸▸▸▸▸430

Inward Excellence

protects your profits



Inward excellence comes as the natural and logical result of intense specialization. When you work with Cameron slitters and roll winders you become aware of this inward quality of excellence, both in detail and in overall machine performance.

You find a gratifying difference in the smooth, positive response of operating controls, the dynamic balance of rotating elements, and precise accuracy of machined parts. You find a rewarding difference in the trouble-free performance of Cameron slitters and roll winders through year after year of service.

This Cameron quality of inward excellence adds to your profits by assuring rolls of constant high quality, pleasing your customers, building your business! It **protects** your profits by assuring high operating speeds, greater machine productivity, and lasting freedom from maintenance worries!

Cameron specialists welcome any opportunity to show the way to low cost, high speed production of better rolls of any material. Your inquiry will receive prompt and specialized attention.

And now, the newest member of the Cameron line

CAMERON

440

SLITTER-WINDER-REWINDER

for paper machine or finishing room

Send for free BULLETIN 3040

The new Cameron 440 employs exclusive design principles and operating features job-proved in actual service on the larger and heavier Cameron mill-type winders. Produced by Cameron's team of specialists, the 440 assures high productivity with dependable, trouble-free performance; finished rolls that meet the highest standards of quality; economy and efficiency of operation unmatched in its class. The 440 provides a choice of pneumatic score-cut or shear-cut slitting. Speeds up to 5000 fpm*. Widths to suit requirements. Maximum rewind diameter 60" (larger at additional charge). Write or telephone for complete details.

CAMERON MACHINE COMPANY, 61 Poplar St., Brooklyn 1, N.Y.

Canada: Cameron Machine Co. of Canada, Ltd., Royal Bank Bldg., Toronto 1

France: Batignolles-Chatillon, 5 Rue De Monttessuy, Paris (7e) France

*Speed depends on width, number of cuts, and characteristics of material.

BUILT BY CAMERON'S team of specialists

AA-337

50 years devoted exclusively to the design and manufacture of slitting and roll winding equipment.

...more quality proved POWELL VALVES

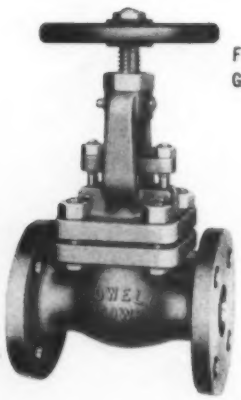
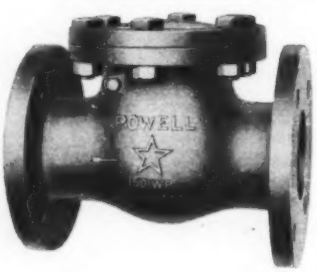


FIG. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.

FIG. 2309 SW—150-Pound Flush Bottom Tank Valve with Powell Patented Seat Wiper.

FIG. 2456 SG—Large Stainless Steel Gate Valve for 150 Pounds W. P. Flanges conform to latest Standards.

FIG. 2433 SS—Large Stainless Steel Swing Check Valve for 150 Pounds W.P.



Designed for long life, designed for dependable service

Consult your Powell Valve distributor for all the facts about quality proved bronze, iron, steel and corrosion-resistant valves. No matter what the flow control problem, a Powell Valve can solve it . . . *better.*

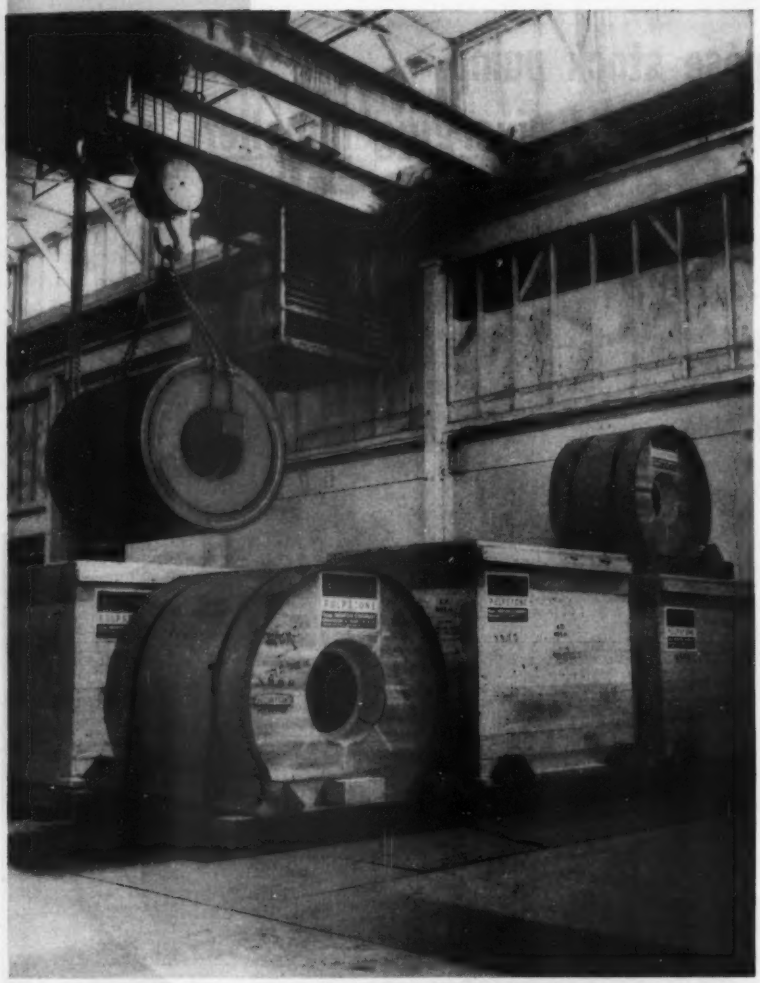
THE WM. POWELL COMPANY, CINCINNATI 22, OHIO . . . 111th YEAR

from **TWO**

Norton Plants...

Norton Pulpstones

Go World Wide



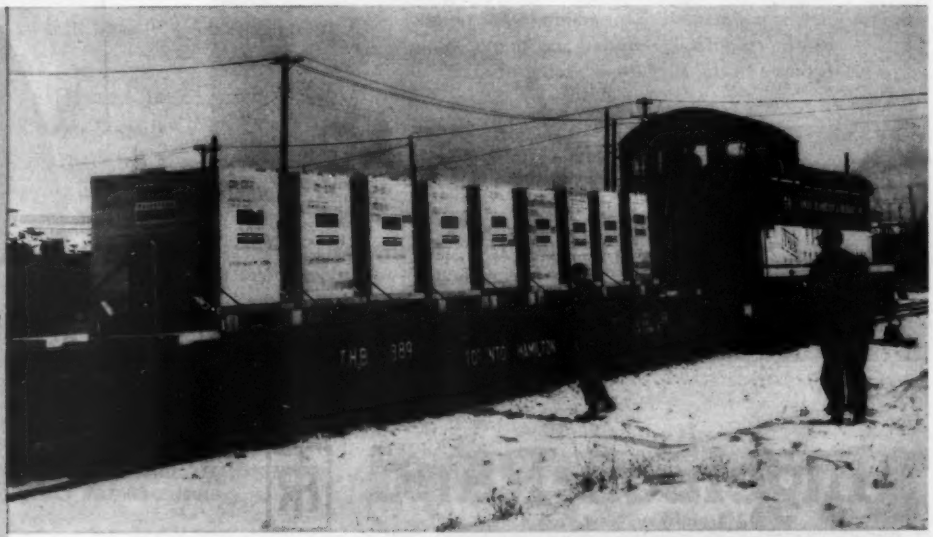
A corner of the shipping room at the Norton Worcester plant showing stones crated for domestic shipment and boxed for export.

FROM the Norton plant at Worcester and from Norton Company of Canada's plant at Hamilton, Ontario hundreds of pulpstones go out each year to meet the world's requirements for mechanical pulp. Each plant has complete facilities for pulpstone manufacture, assuring you two reliable sources of supply in case of emergency.

Norton pulpstone engineers, each with practical paper mill experience, are available the world over to specify the correct pulpstones to meet your particular requirements and to render technical service.

NORTON COMPANY, WORCESTER 6, MASS.
Norton Company of Canada, Ltd., Hamilton, Ont.
EXPORT: Norton Behr-Manning Overseas Inc., Worcester, Mass.

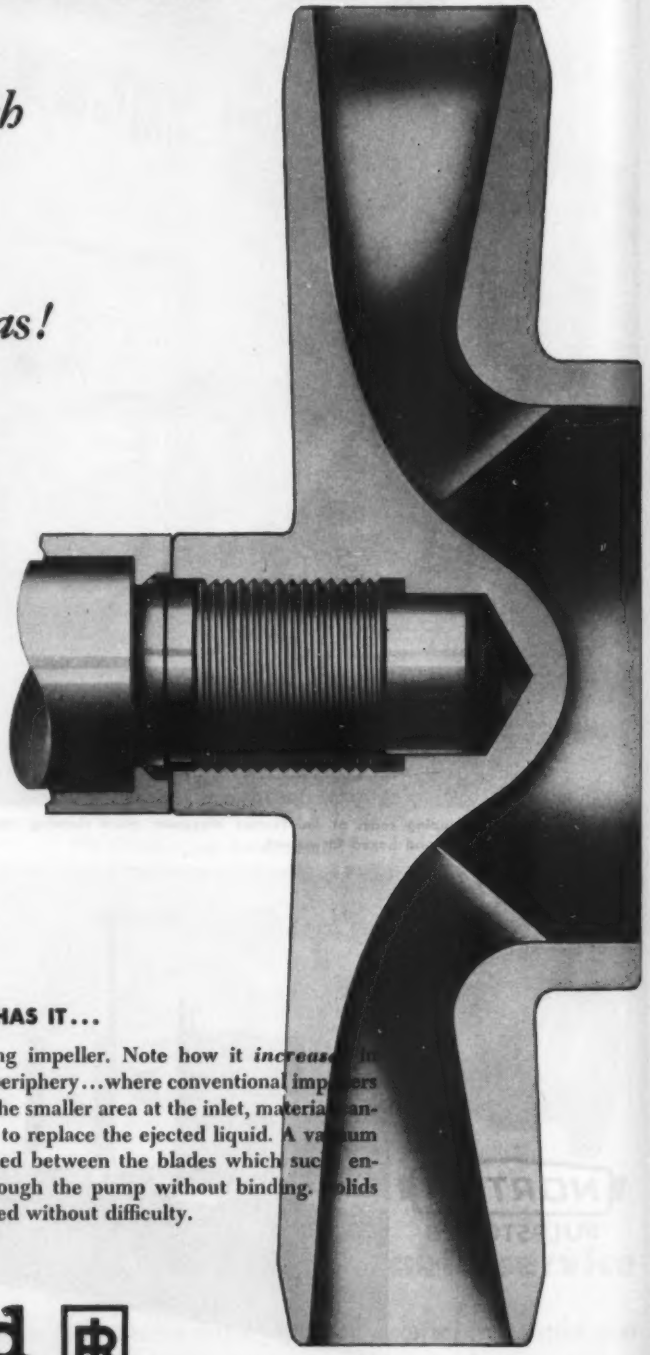
NORTON
PULPSTONES



A carload of Norton pulpstones leaving the plant of Norton Company of Canada, Ltd. at Hamilton, Ontario.

Ingersoll-Rand All-Purpose stock pump with the patented diverging impeller

Handles stocks as high as 10% consistency with large amounts of entrained air or gas!



CAN'T CLOG

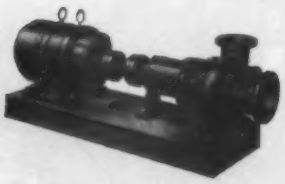
Stocks at consistencies as high as 10% are handled efficiently. With the I-R All-Purpose pump, you get greater chest capacities, lower bleaching costs, savings in mill water.

CAN'T BIND

Foamy stock containing large amounts of entrained air or gas goes through easily and continuously.

CAN'T LOSE PRIME

Treated, sized or foamy stock can be pumped without binding or losing prime as long as flow is maintained to the pump. Stock chests can be completely emptied and suction pipe exposed to the air without losing prime.



NO OTHER PUMP HAS IT...

the exclusive diverging impeller. Note how it *increases* in width from center to periphery...where conventional impellers diminish. Thus, with the smaller area at the inlet, material cannot enter fast enough to replace the ejected liquid. A vacuum space is thereby formed between the blades which sucks entrained air or gas through the pump without binding. Solids and slurries are handled without difficulty.

Ingersoll-Rand

10-631 11 Broadway, New York 4, N. Y.

PUMPS • COMPRESSORS • DIESEL ENGINES • AIR & ELECTRIC TOOLS • TURBO BLOWERS • CONDENSERS

Automation has raised productivity to new high levels

JEFFREY
Spiral Conveyors are important in moving materials

THE HIGH DEGREE of automation has raised productivity per man to new high levels in many plants throughout industry. Transfer of materials is largely under automatic control, for example, as evidenced by these Jeffrey spiral conveyor systems.

Jeffrey spiral conveyors offer an economical means of handling dry, loose bulk materials. Compact, they occupy a minimum of space. Convenient, they can be fed or discharged at any point along their length. Jeffrey makes them in open and dust-tight styles, of metals to suit particular requirements.

Jeffrey engineers will assist in selecting conveyors to meet your handling needs. Catalog 851 describes spiral conveyors. The Jeffrey Manufacturing Company, 944 North Fourth Street, Columbus 16, Ohio.

Paper stock in a paper mill is automatically moved from one operation to another by spiral conveyors.

CONVEYING • PROCESSING • MINING EQUIPMENT . . . TRANSMISSION MACHINERY . . . CONTRACT MANUFACTURING

JEFFREY

Almost every paper machine built in recent years has a Fulton Dryer Drainage System to provide properly graduated dryer temperatures and more uniform drying and faster operation.

Fulton systems are standard equipment with all paper machine builders. Installations on machines – large and small, new and old – number many hundreds.

Regardless of the age, size or speed of your machine, a Fulton system would soon return its cost in benefits.

If your dryer section lacks this essential feature, write for facts and figures.

ROSS MIDWEST FULTON CORPORATION

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Subsidiary of J. O. Ross Engineering Corp., New York

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For Consistent Professional Performance

You can't beat HAMILTON Felts

To stay on the first team,
a football player must consistently
out-perform others competing for his position.

It's the same with felts.

Since 1858, Hamilton Felts have been
on many paper makers' "first team"
because Hamilton Felts have *consistently*
out-performed other felts:

We can supply a Hamilton Felt
of standard construction for more than
300 proven styles . . . or design a variation
to solve *your* specific problem. Whatever
you manufacture, from heaviest board to thinnest tissue,
talk over your problems with
your Hamilton Felt Service Salesman.

YOU CAN'T BEAT
Hamilton
FELTS

HAM FELTZ says:

"Pro-football players don't think it's 'sissy' to guard against injuries—neither should you."

Contributed by P. T., Pittsburgh

Have you a pet safety slogan? Send it to Ham Feltz and let us publish it. Keep the mail "rollin' in!"

SHULER & BENNINGHOFEN, HAMILTON, OHIO

This is an Appleton Finishing Table, under construction. Capable of finishing wires as wide as 408" and up to 229' in length, it started operating in September. Like all of the new, highly specialized equipment recently installed, it was designed by Appleton Wire Works engineers to meet the changing requirements of the paper industry. Appleton Wire Works, Inc. General Offices, Appleton, Wis. Plants at Appleton and Montgomery, Ala. International Wire Works, Menasha, Wis., an affiliated company.

APPLETON WIRES ARE GOOD WIRES

ANNOUNCING

VINYL-ACRYLIC

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photomicrograph
of vinyl-acrylic
RESYN® 2203 particles

upgrades all types of coatings

RESYN 2203 is a new vinyl-acrylic latex that promotes stronger coating bonds to paper. Offers high pigment binding power as well as strong affinity for cellulose fibers. Produces a highly flexible coating, with good calenderability. Yet imparts no limpness to base stock.

RESYN 2203 offers good mechanical stability and is compatible with starches and other coating materials.

When dry, films exhibit no cloudiness and are virtually odorless. Resistance to oil and water is excellent.

RESYN 2203 can improve all types of coated papers and boards — from offset and letterpress stocks to bread wraps and boxboards. Sound interesting? Write for technical data and suggested formulations. Or call your nearest National office.

National

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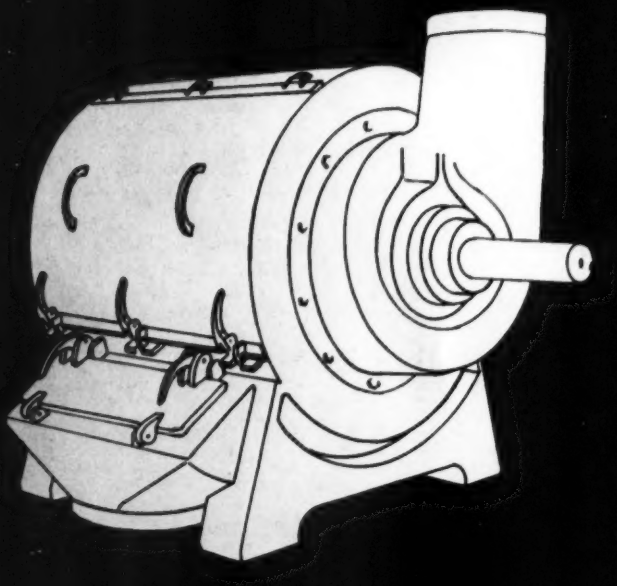
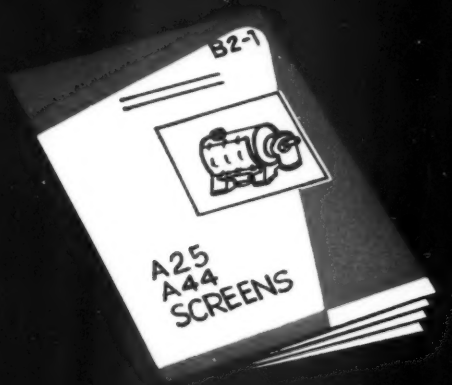
Vacation for the Appleton man who calls on you? Seeing isn't always believing, even through the eye of the camera. A 12-hour workday is hardly a holiday. And that's about par for the five-day course on felt technology your Appleton man takes each year. Worth it, though, because it *keeps* him qualified to help you with your problems of felt application and performance. Appleton Woolen Mills—*a working partner with the paper industry*—Appleton, Wisconsin.

Appleton felts

- ★ HIGHEST QUALITY ACCEPTED STOCK
- ★ HELICOIDAL STOCK INLET
- ★ FRACTIONATING SCREENING PRINCIPLE
- ★ REJECTS AT REFINING CONSISTENCY
- ★ ENGINEERED SIMPLICITY



CENTRIFUGAL SCREENING AT ITS VERY BEST



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In Canada, Sherbrooke Machineries Limited, Sherbrooke, Quebec

TITANOX* gives paper a bright new look

The remarkable optical properties of TITANOX white pigments are most aptly illustrated by their use in paper. To increase brightness and opacity of wax papers . . . to increase legibility in printing papers by reducing show-through . . . to eliminate dull backgrounds in packaging stocks . . . or simply to give a bright new look to paper cups—TITANOX is your first choice in titanium dioxide white pigments.

Our Technical Service Department will be glad to discuss with you the best use of TITANOX. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices in principal cities.

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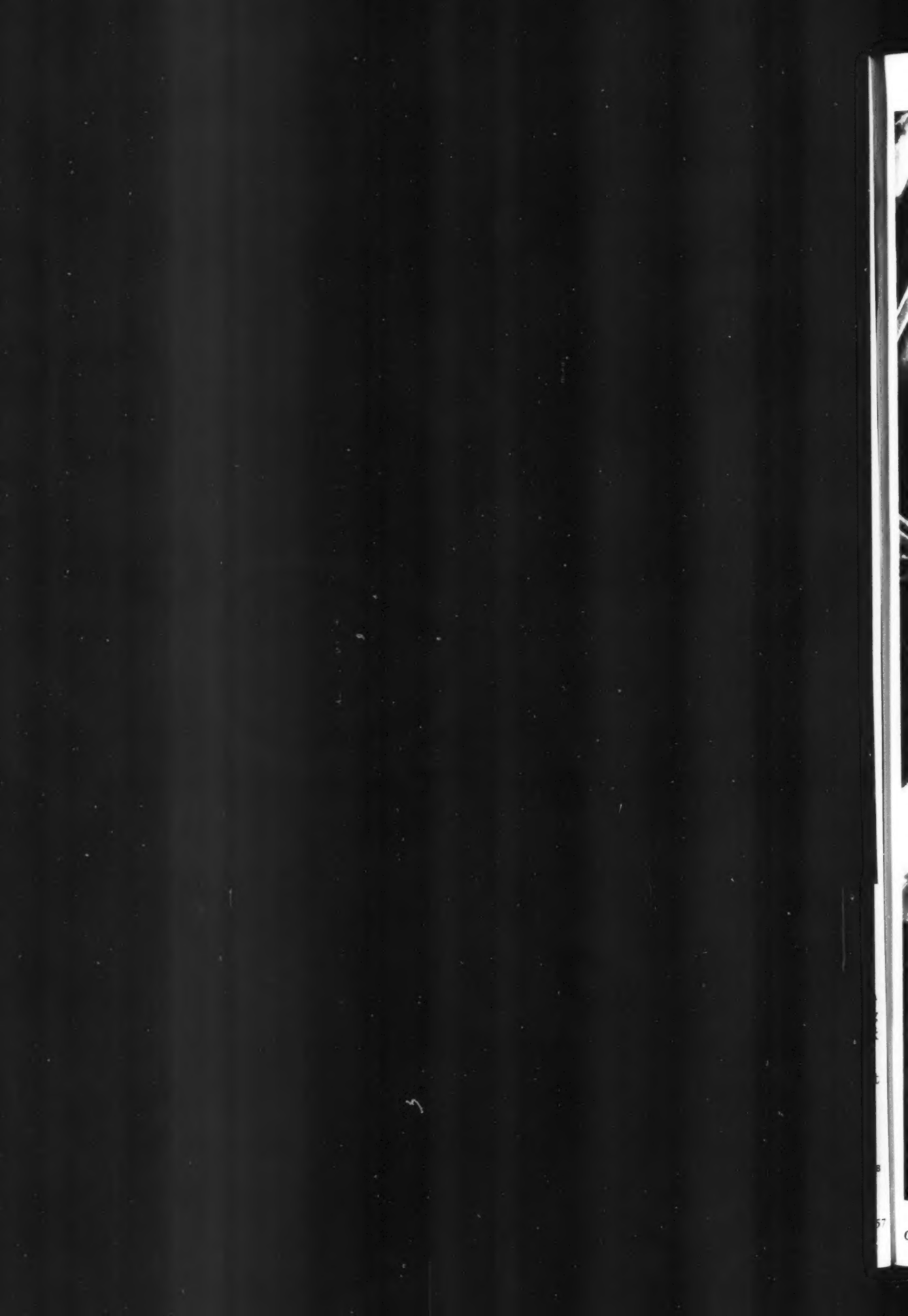


Flame Thrower!
WEYERHAEUSER
PULP
DIVISION

Feature articles

From Elk Falls to Antioch — A unique Crown-Zellerbach operation

A. W. J. DYCK

Part I — The sulfate pulp mill at Elk Falls

Chips and pulp are handled on an elaborate conveying system; the pulp stacking and loading systems are unique in the pulp manufacturing industry; the automatic bleach liquor preparation system is one of the first in pulp and paper.

ONE OF THE MOST unique developments, which marks a revolutionary concept in the handling and transportation of pulp, has been in operation at Crown Zellerbach Corp.'s Elk Falls Co. Ltd. mill for over a year and has fully proved itself. This operation involves (1) the production of sulfate pulp in shredded form at Elk Falls, Vancouver Island, (2) the economical transportation of this "noodle" pulp in wet form in a specially designed 14,600-ton tanker 1100 miles down the West Coast to Crown Zellerbach's Antioch mill in California, and (3) the conversion of this pulp at the Antioch mill into kraft linerboard and kraft bag papers. The operation eliminates the necessity of completely drying the pulp, with a consequent loss of strength, and then reconverting the pulp to a wet state prior to its use in a paper mill. To date, there are only two instances known, i.e., at International Falls, Minn., and at Madawaska, Maine, where pulp is piped in wet form from Canada to the United States.

What are the detailed steps in this remarkable operation which constitutes an investment of $15,000,000 at the Elk Falls operation and a $5,000,000 investment in the specially designed tanker?

Chip handling

Chips, predominantly from hemlock and fir, are brought in barges from 25 sawmills located on Vancouver Island and on the lower mainland of British Columbia. Chips from sawmills are the major source of supply for the new kraft mill, which requires some 25,000 units (a unit measures 200 cu. ft.) per month for its 500-ton daily output.

Two chip barges per day are unloaded on a round-the-clock basis — seven days a week — by a traveling crane capable of handling 50 units of chips per hour on an average operating cycle of 32 sec.

The crane is specially designed with a double-cantilevered boom counterbalanced by a traveling counterweight trolley, thereby keeping the crane wheel loading to a minimum. The unloader is equipped with the most modern electrical control equipment to permit maximum operator efficiency and smooth hoisting. The crane is equipped with a 4¾-yd., 4-line combination steel and aluminum grab bucket designed specially for this operation.

A mountain of about 20,000 units of chips is stock-piled by the crane to insure continuous operation of the kraft mill. Chips are transported by a conveyor belt to two trippers discharging according to species into two silos of 400-units capacity each. The silos

Chip unloading is accomplished by a 50-units per hour capacity Colby crane equipped with a combination steel and aluminum grab bucket designed especially for this operation. A D-8 Caterpillar tractor redistributes chips on the 20-unit pile.

The Conveyair Sales Ltd. feeder receiving chips from a belt conveyor.

The digester floor showing Dominion Bridge Co. digesters with chip-charging facilities and Bailey Meter Co. control panels.

B. C. Research Council black liquor oxidation towers, water accumulator and blow tank featuring jet condenser and Rosenblad spiral heat exchangers.

Bailey Meter Co. main digester control panel featuring automatic tank control system for charging white and black liquor and knots.

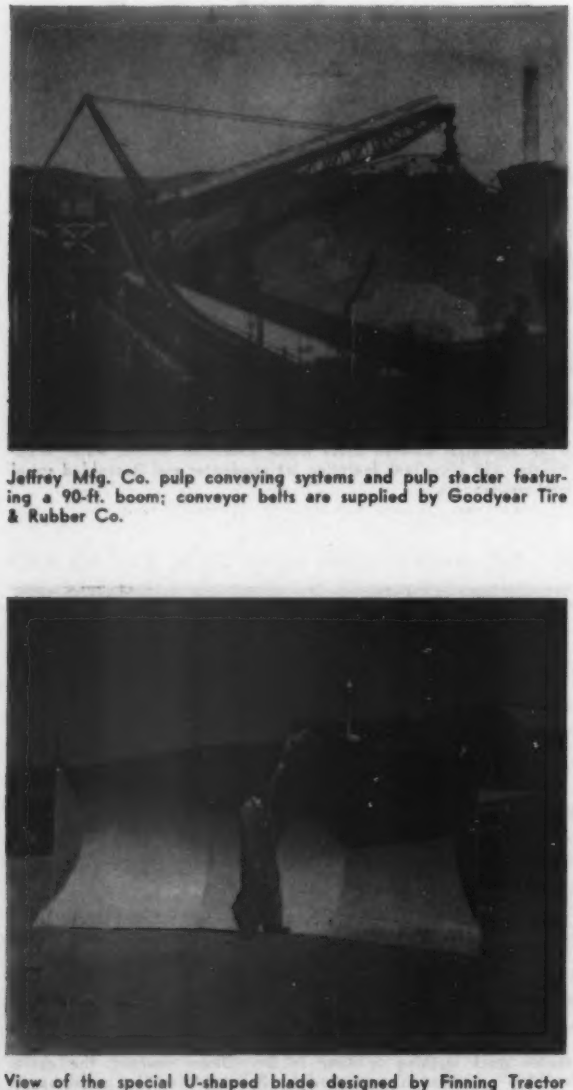
Brown stock washing is done in Dorr-Oliver washers; the entire washing operation is controlled by Bailey Meter Co. panel board controls.

View of Sherbrooke Machinery sheet former, Paper Machinery feltless press and Dorr-Oliver pulp shredder.

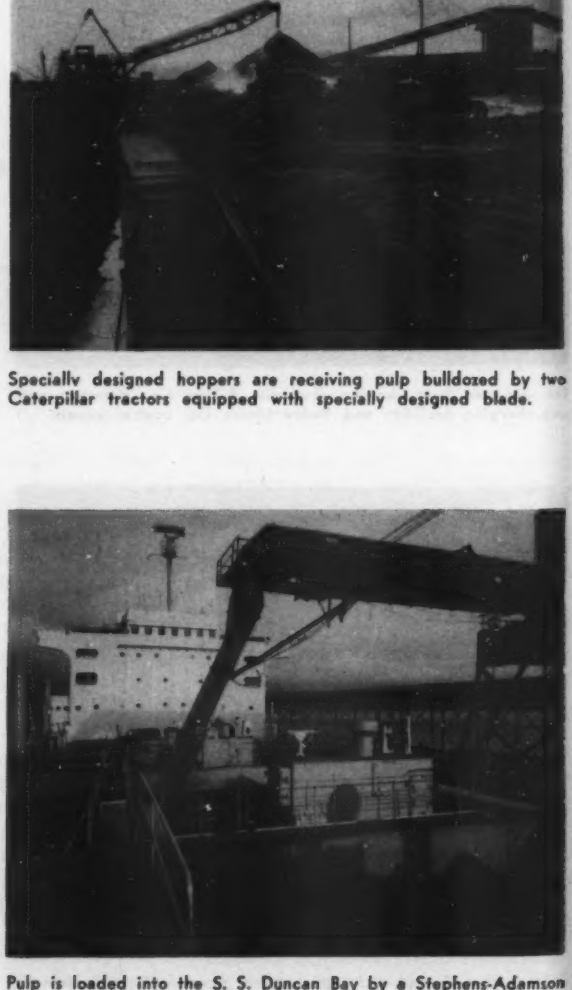
View of Lamb-Grays Harbor folder baler, the first of its kind and still in the development stage.

Jeffrey Mfg. Co. pulp conveying systems and pulp stacker featuring a 90-ft. boom; conveyor belts are supplied by Goodyear Tire & Rubber Co.

Specially designed hoppers are receiving pulp bulldozed by two Caterpillar tractors equipped with specially designed blade.



View of the special U-shaped blade designed by Finning Tractor & Equipment Co. engineers for the Caterpillar tractors.



Pulp is loaded into the S. S. Duncan Bay by a Stephens-Adamson loader equipped with boom, conveyor and swiveled spout.

The S. S. Duncan Bay with a cargo of needle pulp.

are equipped with rotary feeders which supply a 36-in. wide rubber belt conveyor that leads to the trippers on top of the digesters. The rotary plate feeders, driven by 30-hp motors through helical worm gear reducers, are capable of handling 0-28,800 cu. ft. of chips per hour. They operate at 5.75 rpm. The 17-ft. diameter rotary plate is carried on six trunions mounted in self-aligning roller bearing pillow blocks. The feeders are equipped with steel collar and rods and adjustable plow and steel hopper.

A further supply of chips comes from a new, highly-mechanized sawmill which is equipped with a mechanical barker, a 78-in. three-knife chipper and two 48-in. horizontal chippers and chip screens. The chips prepared in the new sawmill are fed by a rotary vane chip feeder, 36-in. diameter with a capacity of 30 units per hour, into a chip screen. The chip feeder operates at variable speed from 10 rpm down to 3.33 rpm and uses a 3-hp motor driving through a flexible coupling to a P.I.V. unit. The P.I.V. outlet shaft is directly connected to a helical gear reduction unit which, in turn, drives the main shaft of the vane feeder through a roller chain drive.

An additional supply of chips comes from the existing wood mill, where a new 112-in. six-knife chipper has been installed.

The screened chips are dropped on a conveyor belt that runs over a weighing apparatus and then fall into a positive discharge Star feeder. This feeder, specifically designed for the wood by-products field, moves chips into a stream of air. The feeder is driven by a 5-hp electric motor through a reduction unit and a flexible coupling. The feeder is equipped with replaceable shear knives which prevent the pinching of chips between the rotor and housing.

The chipveyor system is designed to convey screened chips at the rate of 60 tons per hour over a distance of 1250 ft. horizontally, with a vertical rise of approximately 100 ft. A 125-hp motor is used to drive an industrial blower which produces the necessary air pressure for the chipveyor installation. The blower is equipped with a combination silencer and air filter. The piping used in this system is 12 in. in diameter with 3/16-in. walls, while the elbows have ¼-in. thick walls. The special design of the system is such that no damage is done to the chips handled, and there is little wear on the pipes as the chips are suspended in an air stream and only touch the pipe walls at the elbows where there is a change of direction.

The chips are discharged at two points. At a point approximately 400 ft. from where the chips enter the conveying system a specially constructed "Y" valve has been put in to direct the chips into a separating cyclone. The chips are discharged in this cyclone and fall directly onto the conveyor belt which carries chips to the storage silos. When the chips are blown the full 1250-ft. length and to an elevation of approximately 100 ft., they are discharged through a multi-direction open discharge nozzle to an outdoor storage pile.

A pressure control panel controls the feeder, blower and the belt feeding the chips into the feeder, which makes the system entirely self-operating.

Pulping operation

Chips are digested in eight 4630-cu. ft. capacity digesters. Six of these digesters are made of 2-in. thick mild steel walls, one is Inconel-clad and one is made of Oxirim steel. The six digesters made of A.285 grade "C" plate chemically-modified steel are 11½ ft. in diameter and 54 ft. high. The Inconel-clad digester is 11½ ft. in diameter and 54 ft. high.

The digesters are equipped with neck strainers and circulating heating systems. Each digester heater contains 900 sq. ft. of heating surface. The shell side of the heater is made of carbon steel, and the tube side is made of Type 304 stainless steel. Digester liquor circulation is achieved by Type 8 by 10 by 16½ centrifugal circulating pumps.

A separate control panel for each of the eight digesters automatically controls the pressure and temperature within each digester, while digester relief is controlled by temperature difference. A top and bottom digester temperature recorder provides a check on the efficiency of the liquor circulation.

The main digester panel board features an automatic tank control system which automatically charges the digester with a preset volume of white liquor, black liquor and knots. The total steam flow to the digester building is recorded and totalized for accounting purposes.

Steam flow on each digester is controlled by a positrol, a Type 3500 position or valve controller.

The cooked chips are blown into a blow tank which is equipped with jet condenser and six spiral heat exchangers for blow heat recovery amounting to 48,500,000 BTUs. The recovered heat is used in heating water in the water accumulator.

Mill odors are reduced in the black liquor oxidation and digester odor absorption system designed by the British Columbia Research Council. Noncondensable gases from the jet condenser are drawn into the oxidation towers through a duct which is connected to the accumulator-tank vent near its base. In this way the gases are quickly mixed with a large excess of air and then passed through the oxidation system concurrently with the weak black liquor. The oxidation of the malodorous gases, consisting of mercaptans, results in their fixation and absorption in the black liquor, so that the spent air leaving the towers has very little, if any, kraft odor.

Black liquor recovery

Black liquor is evaporated in a sextuple-effect Lundberg-Ahlen evaporator and further concentrated in a special cyclone evaporator replacing the conventional cascade evaporator.

The concentrated liquor is burned in a two-drum single-nozzle recovery furnace capable of producing 200,000 lbs. of steam per hour.

The main recovery panel board conveniently located on the firing floor indicates, records and controls all steam production and process variables. The panel board, featuring plug-in receiving elements and sealed inking system, provides records and control of cyclone evaporator level, liquor pressure and temperatures, dissolving tank level and density, total and primary air flow to the furnace, three-element feed water control, steam pressures and steam temperatures. Gas temperatures throughout the recovery unit are recorded and draft losses indicated on a multi-point gauge.

The central panel controlling the sextuple-effect evaporator operation includes steam and liquor flow con-

trollers and a boiling point recorder controller for maintaining and controlling the desired Baume of the heavy liquor. Motor control stations, level recorders on weak and heavy liquor tanks, conductivity alarms and a multi-point temperature instrument for recording vapor and liquor temperatures are also mounted on this panel.

Boiler feedwater is heated and deaerated in a jet tray deaerator of 250,000 lbs. per hour capacity equipped with an internal vent condenser and stainless steel deaerating trays.

A four-unit sodium zeolite softener is used to remove hardness from the raw feedwater. The softener battery has a capacity of 250 gpm. The exchange units are equipped with hydromatic single control valves arranged for automatic operation so that, when a softener requires regeneration, the automatic controls remove it from service, perform the various functions required for regeneration and then return the unit to the line for service.

Wet pulp preparation

Pulp is first passed through five Jonsson knotters equipped with screens and screen plates made of 304 stainless steel and with self-contained vats made of plain steel. The screens feature submerged inlets to prevent foaming. The screen plates have ¼-in. diameter perforations. Power consumption for the five screens is less than 15 hp.

From the knotters it goes to three 11½- × 20-ft. brown stock washers equipped with exhaust system and hood. Brown stock then goes to a high-density tank equipped with high-density mixing nozzles and agitators.

From the high-density tank stock is pumped by a pump driven by a 150-hp motor to a 11½- × 6-ft. heavy-duty decker known as the sheet former. The sheet former is a vacuum filter served by a 16K31 vacuum pump. The sheet former is equipped with exhaust system and hood.

An automatic control panel records and controls the white water and machine chest level, stock consistency and high-density storage tank level.

The pulp sheet leaving the sheet former at 28 per cent A.D. passes to a feltless press from which the sheet emerges at 35 per cent A.D. The press is the H-800 Type and is the largest of its kind ever built. It is 198 in. wide with a roll diameter of 31½ in. The feltless press is equipped with three lead-in rolls that properly guide the sheet into the press. One of the lead-in rolls is stationary, and the other two are retractable. Also provided is a water doctor consisting of a structural steel holder and removable stainless steel doctor blade. It is installed at the inlet side of the nip to remove the water which is being squeezed out from the top of the pulp sheet.

Loading on the press is carried out by means of two Stabiload air cylinders, which are mounted inside the press frames and are connected to the top roll through levers and turnbuckles.

From the press the pulp sheet enters a shredder which basically consists of a rotating shaft provided with a number of hooks that tear the pulp into shreds.

A folder-baler is provided as a standby unit to stack wet pulp into 4- × 4-ft. bundles for shipment by land in the event that the present method of shipping shredded pulp by tanker is interrupted. This folder-baler is the first machine of its type ever built, and many of its features are still in the development stage.

Bleach plant

Since the newsprint mill at Elk Falls uses 20-25 per cent of bleached sulfate in newsprint production, a new bleach plant went into operation on June 17, 1957. The bleach plant is semi-automatic with one man in control of operations including screens, decker and bleach liquor preparation. The capacity of the bleach plant is 175 tons per day, bleaching in the case of newsprint to 65 per cent brightness. The stages of the bleach system are: (1) chlorination, (2) caustic extraction, (3) high-density hypochlorite bleaching and (4) high-density hypochlorite bleaching. Between each bleaching stage the pulp passes through washers.

The chlorination, caustic extraction and hypo-chlorite towers are equipped with double-shaft pulp mixers. These consist essentially of two shafts rotating toward each other with alternate round and pitched blades which mix and propel the pulp forward through the mixer. The rotors are made of a series of integral stainless steel castings that are machined and then slipped over the shaft. Each casting has two round blades and two pitched blades. A sealing weld bead prevents any leakage into the carbon steel shaft. Power is supplied to each shaft through V-belt drives.

Bleach liquor preparation

The mill is operating a continuous automatic calcium hypochlorite system. The unit is remotely controlled from the central bleach plant control panel on the washer floor and produces bleach liquor of desired quality and rate as determined by pulp bleachability tests. Density measurement is used for control of slurry concentration, and oxidation-reduction potential measurements are used for control of bleach liquor quality. Automatic safety shutdown and alarm provisions are incorporated.

Chlorine is used in gaseous form both for direct chlorination and in the automatic calcium hypochlorite system. It is received in 55-ton tank cars. Liquid chlorine under controlled dry air pad pressure is pulled from one tank car at a time, flows through an automatic signal tank and through one of two 2000-lb. per hour evaporators. The automatic evaporators are steam heated, solid nickel body units. Chlorine gas at controlled temperature and pressure is piped to the points of use.

As a tank car goes empty, a signal is energized and the operator simply changes valves in the building to supply liquid chlorine from a new car standing ready at the unloading station. The empty car is then blown down into the automatic bleach liquor system to save all of the residual gaseous chlorine in the tank car. Automatic pressure and flow control valves are used throughout to assure efficient, controlled usage of chlorine.

Caustic soda is received in tank cars at 50 per cent concentration. The cars are emptied into storage tanks by air pressure. To prevent freezing in cold weather, steam heat is supplied through a single nickel pipe coil near the base of the storage tank.

Pulp handling and loading

The pulp which emerges from the shredder in noodle form at 35 per cent A.D. is handled in a vast overhead conveying system (most of it enclosed as a protection against high winds) which carries it either to the pulp stacker for storage in the asphalted storage area or direct to the dock for immediate loading.

First there are belt conveyors which convey the shredded pulp to the 900-ft. long rubber belt conveyor. The pulp is then taken from this conveyor belt and uniformly piled, according to species, by a long-necked 42-inch wide stacker belt conveyor which travels along rails over the 900-ft. rubber conveyor belt.

The conveyor systems are of conventional design using rubber belts 24 in. to 72 in. in width. All troughing idlers supporting these belts are standard type of either 20° or 45° trough. All pulleys are heavy-duty steel type with cast iron detachable hubs and machined faces.

The pulp stacker, equipped with a 90-ft. boom, is a unit mounted on a carriage supporting it approximately

Principal equipment installed at Crown-Zellerbach's Elk Falls mill

Chip handling

Barker, mechanical	Nicholson-Murdie
Blower, industrial, equipped with combination silencer and air filter	Roots-Connersville Blower Corp.
Chipper, 78-in., 3-knife	Sumner Iron Works Ltd.
Chippers (2), 48-in., horizontal	Hansel Engineering Co.
Conveyors	Jeffrey Mfg. Co. Ltd.
Conveyor belts	Goodyear Tire & Rubber Co.
Chipveyor system	Conveyair Sales Ltd.
Crane (1), Colby, 50 units per hour capacity	Colby Steel & Mfg. Co.
Cyclone on chipveyor system	Conveyair Sales Ltd.
Motor controls	Westinghouse Electric Corp.
Motors, electric	General Electric Co.
Nozzle, multi-direction open discharge, on chipveyor system	Conveyair Sales Ltd.
Rotary plate feeders (2)—equipped with 17 ft. diameter rotary plates	Link-Belt Co.
Rotary vane chip feeder, 35 in. diameter, 30 units per hour capacity	Link-Belt Co.
"Y" valve on Chipveyor system	Conveyair Sales Ltd.

Pulping operation

Blow tank, equipped with jet condenser	Western Bridge & Steel Fabricators
Conveyors	Jeffrey Mfg. Co.
Conveyor belts	Goodyear Tire & Rubber Co.
Digesters (6), 2-in. mild steel construction, equipped with Esco strainers, 5000 cu. ft. capacity	Dominion Bridge Co. Ltd.
Digester (1), Inconel-clad	Dominion Bridge Co. Ltd.
Digester (1), Oxirim steel	A. O. Smith Corp.
Digester control panels and instruments (8), one for each digester	Bailey Meter Co. Ltd.
Digester heaters, 900 sq. ft. heating surface each	Foster Wheeler Ltd.
Digester liquor circulating pumps (8), Type 8 by 10 by 16½	Bingham Pump Co.
Exhaust system in the digester building	Ross Engineering of Canada Ltd.
Liquor and water pumps	Allis-Chalmers Mfg. Co.
Main digester panel board, with automatic tank control	Bailey Meter Co. Ltd.
Oxidation towers for black liquor (2)	B. C. Research Council (Design: Ross & Howard Fabricator)
Positrols (8), Type 3500	Fisher Governor Co.
Pumps, liquor and water	Allis-Chalmers Mfg. Co.
Spiral heat exchangers (6), recovering 48,500,000 BTU's from contaminated blow steam condensate	Rosenblad Corp.

Black liquor recovery

Cyclone separator	The Babcock-Wilcox Co.
Diaphragm control valve, Type 667-AA, with Type 3500 Positrol, on 3.4-per cent lime storage tank	Fisher Governor Co.
Electrostatic precipitator	Koppers Co. Inc.
Evaporators, sextuple-effect, Lundberg-Ahlen	Chicago Bridge & Iron Works
Evaporator control panel	Bailey Meters Co. Ltd.
Feedwater deaerator, 250,000 lbs./hour capacity, equipped with internal vent condenser and stainless steel deaerating trays	Cochrane Corp.
Feedwater softener, four-unit type, 250 gpm capacity	Cochrane Corp.
Pumps	Worthington Corp. Taber Co.
Recovery furnace, two-drum, 200,000 lbs. steam/hour capacity	Babcock & Wilcox Co.
Recovery furnace control panel	Bailey Meter Co. Ltd.
Salt cake Air-Veyor system, handling salt cake from rail cars to dissolving tanks	Fuller Co.

Bleach plant and bleach liquor preparation

Automatic calcium hypochlorite preparation system	Hooker Electrochemical Co.
Bleach towers (4)	Chemical Linings Inc. and Western Bridge & Steel
Bleach tower mixers, double shaft type, rotors made of stainless steel	James Brinkly Co.
Caustic soda handling system	Hooker Electrochemical Co.
Chlorine handling and evaporating system	Hooker Electrochemical Co.
Consistency regulators	De Zurick Corp.
Cowan screens (3), junior size	Hydraulic Machinery Co. Ltd.
Decker	Dorr-Oliver Inc.
Instrumentation	Foxboro Co.
Pumps	Worthington Corp. Bingham Pump Co. Allis-Chalmers Mfg. Co.
Washers (4)	Dorr-Oliver Inc.

Wet pulp preparation

Brown stock washers (3), 11½ x 20 ft.	Dorr-Oliver, Inc.
Brown stock washer instrumentation	Bailey Meter Co. Ltd.
Consistency regulators	De Zurick Corp.
Exhaust system and hood over knotters	Ross Eng. of Canada Ltd.
Exhaust system and hood over the sheet former	Ross Eng. of Canada Ltd.
Fan pump, driven by 150-hp G. E. motor	Allis-Chalmers Mfg. Co.
Folder-baler (1)	Lamb-Grays Harbor Co. Inc.
Jonsson Knotters (5), with screens and screen plates made of 304 stainless steel	Bird Machine Co.
Kamyr feltless press, H-800 Type, 198-in. wide, and 31½ in. roll diameter, equipped with three lead-in rolls and two stabiload air cylinders	Paper Machinery Ltd.
Motors electric	General Electric Co.
Pulp shredder	Dorr-Oliver Inc.
Pumps	Allis-Chalmers Mfg. Co.
Vacuum pump serving sheet former, Type 16K31	Roots-Connersville Blower Corp.
Wet machine instrumentation, automatic control panel recording and controlling white water and machine chest level, stock consistency, etc.	Bailey Meter Co. Ltd.
Sheet former (1), Impco	Sherbrooke Machineries Ltd.

Pulp handling and loading

Conveyors, with rubber belts varying from 24-72 in. in width	Jeffrey Mfg. Co. Ltd.
Conveyor belts, 24-72 in. wide	Goodyear Tire & Rubber Co.
Pulp loader, equipped with boom, conveyor and swiveled spout	Stephen Adamson Mfg. Co.
Pulp stacker, with 90-ft. boom and 36-in. wide belt	Jeffrey Mfg. Co. Ltd.
Tractors (2), D-8 Caterpillar, with special U-shaped bulldozer blade	Caterpillar Americas Co.

50 ft. above the track level. The track gauge is 30 ft. and approximately 600 ft. long. The carriage is driven, at the rate of 33 fpm, through individual 10-hp drives on the front two wheel boxes by chain from the reducer to the wheels.

The boom has a conveyor consisting of a 36-in. wide belt powered by a 7½-hp motor. The belt is fed from a tripper which is an integral part of the stacker arrangement and is located in the stacker carriage directly above a 48-in. belt running parallel to the storage area.

The stacker movement, belt operation, boom raising and lowering are all controlled by an operating cab located on top of the carriage. The complete system, back through the conveyors carrying the pulp from the source, is interlocked so that the stopping of any unit shuts down the complete line.

During loading operation two D-8 tractors, equipped with torque converter drives and a new type 15-ft. wide and 6½-ft. high U-shaped bulldozer blade, bulldoze pulp over a ramp into traveling hoppers which may be spotted at any point along the edge of the storage area. The hoppers feed a 72-in. rubber belt conveyor leading to the new loading dock.

When not used in loading, the two tractors are used to redistribute the pulp over the storage area.

(Continued on page 593)

Some of the more recent uses of chemicals in the manufacture of wood pulp

WARREN BEAZLEY*

Part IV—Nitric acid pulping

DURING the last few years there has been a revived interest in the use of nitric acid as a pulping agent. *Canadian Pulp and Paper Industry* carried in its March 1956 issue an article describing a nitric acid pulping process known as the Desforges-McLaughlin process. The claims were for a continuous process that could be carried out at atmospheric pressures and temperatures of 65-70° C, with reaction times in the range of 20 mins. to 2 hrs. depending on wood species and pulp grade desired. The process yields a high-grade high-yield pulp from a wide variety of wood species, including the western red cedar, which gives the best results.

The pulping process, which involves the use of a catalyst in the digesting solution to control the nitrating reaction, is completely exothermic; consequently, there is no need for any pressure or heating equipment. The pulping temperature of 65-70° C is maintained without any cooling system.

The process involves almost complete chemical recovery and requires very little refining equipment. Pulps were said to be easy-bleaching and suitable for papermaking. All in all, the article was one of considerable interest.

Other periodicals contained descriptions of the new patended Delbay process, which uses 30 Baumé nitric acid to produce pulp at 50 per cent yield of a quality superior to that of sulfite pulp.

Now the concept of producing pulp from cellulosic material by means of nitric acid is not a new one. In 1846 a G. J. Mulder suggested the use of fuming nitric acid for this purpose; in 1861 British patent No. 381 was granted to Barre and Blondel for a nitric acid process using 30 per cent acid for 24 hrs. at room temperature. German patent No. 60,233 was granted to Lifschütz in 1891 for a process employing nitric and sulfuric acids. In the early 1900's there was continued interest in England, France and Germany; until in 1936 J. Kleine introduced a nitric acid process at the Wolfen mill of I. G. Farben. A pulp of high alpha cellulose content for the production of viscose rayon was made at the rate of 40 tons per day.

In the early 1940's there were Canadian and U. S. patents granted for further developments in nitric acid pulping. And one would expect that the work of Desforges and McLaughlin on the West Coast will lead to further patent coverage.

Thus there is considerable evidence that good paper and dissolving pulps can be made by using nitric acid, and that the yields will be higher than from conventional processes.

You might ask, then, why nobody is using this process. We understand that the Wolfen mill in Germany is still using this process—principally because it has a source of cheap nitric acid that appears as a by-product in the production of nitrobenzene and nitrotoluene. Actually, this by-product is a mixture of nitric and sulfuric acids; these acids are separated, the sulfuric acid going to the production of super-phosphate fertilizer and the nitric acid going to the pulp mill. The relatively high cost of nitric acid apparently is the stumbling block in North America.

As I see it, this problem could be solved in several ways:

1. If a catalyst could be found that would reduce the consumption of nitric acid—perhaps by favoring oxidation at the expense of nitration. (This is the basis of the above-mentioned work of Desforges and McLaughlin in Vancouver.)

2. If a recovery process could be worked out that would relcaim nitric acid in the waste liquor. This perhaps could be integrated with lignin recovery and lead to some interesting by-products.

3. By finding or developing a source of cheap nitric acid. Perhaps some scheme similar to that used by I. G. Farben could be worked out.

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Sectional electric vs. mechanical differential drives

A. W. J. DYCK

A critical evaluation of opinions expressed by engineers and operating personnel in the paper manufacturing field.

WHAT DRIVE should paper mills select—a sectional electric or a mechanical differential? This is the question that confronts the paper manufacturer every time he adds a new paper machine to his mill.

The answer to this question should be thoroughly investigated, as it depends on local mill conditions and the relative merits of one type of drive vs. the other.

The answer is relatively simple if the paper manufacturer decides on a Beloit paper machine, in which the mechanical differential drive is often supplied as an integral part of the machine.

The answer may not be as simple if the paper manufacturer is committed to an output of a variety of paper grades from the same machine; if he anticipates future speed-ups, load increases or additions to the dryer section; or if he has in his organization a strong electrical engineering and maintenance department.

The mechanical differential drive

In recent years the mechancial differential drive, first developed by Beloit Iron Works (Fig. 1), has come into prominence and is currently enjoying great popularity. Its popularity has been such that recently both Black-Clawson Co. and Rice Barton Corp. have added their own differential drives to those now available. The mechanical differential drive gears all driven sections of the paper machine together in a fixed ratio through a single line shaft driven by an adjustable speed turbine or electric motor. The drive when supplied is an integral part of the paper machine.

All power take-offs to individual sections of the paper machine are through the gears and mechanical speed changers of the differential drive units. The drive unit transmits the major portion of the power through the driven side of the differential, known as the "constant speed side", and is geared directly to the lineshaft in a fixed ratio.

The other side of the differential is driven from the lineshaft through a variable speed transmission (Link-Belt P.I.V. or hydraulic) and reduction gears in a ratio which may be changed by the operator. The variable speed transmission with its 400-per cent output speed range is used to increase the section's speed only 6 per cent, which permits the extreme sensitivity of draw control attributed to the mechanical differential drive.

While a 6-per cent speed adjustment is more than adequate for most machines, special arrangements are available with sufficient range to accommodate the requirements when changing from flat to creped paper.

A control pushbutton permits the operator to adjust draws at will. The moment he removes his finger from the button, the speed of the section again becomes positively geared to the lineshaft in the newly established fixed ratio. Units provided with slack take-up permit a momentary change in ratio with a return to the originally established ratio.

The output shaft of the differential unit is connected to a special helical gear reducer through an air-operated clutch. The helical gear reducer in turn is connected to the paper machine shaft. If required, an air-operated brake, controlled from the same operator's valve as the clutch, can also be installed.

To accommodate any differences of elevation of the input shafts, the helical gear reducers may be mounted at any suitable angle desired.

Advantages of the mechanical differential drive

The following advantages are generally attributed by operating personnel to the mechanical differential drive:

1. Ease of operation. The controls for inching, running, braking and slack take-up are conveniently located in the front side of the operator's panel. To facilitate smooth starts and to show continuously the torque carried on each unit, a torque indicating device is included.

2. Excellent draw control. Draws are being held without variation with the result that sheet breaks have been sharply reduced, even those on the wet end of the machine. This comparative absence of strain on the sheets has resulted in high standards of paper strength and quality.

3. Ease of maintenance. The operation of the mechanical differential drive is easily understood by present mill operators and maintenance personnel who are more familiar with gears, bearings and shafting than with electrical equipment.

4. The heavy components of the mechanical differential drive can be in-

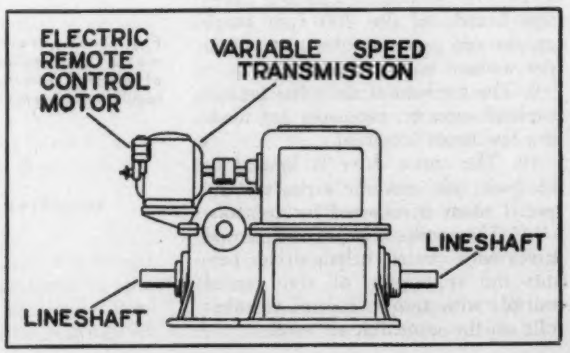

Fig. 1—Diagrammatic presentation of the Beloit mechanical differential drive.

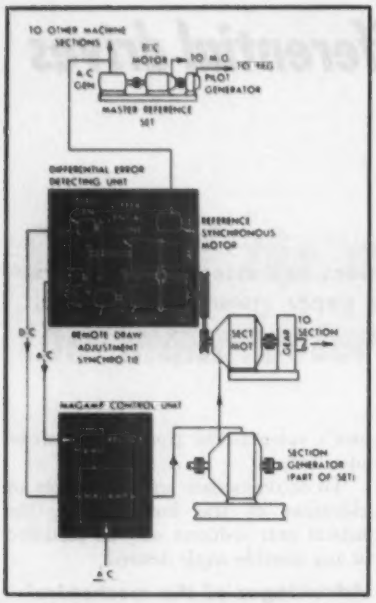

Fig. 2—Diagrammatic presentation of Westinghouse regulating system.

stalled by the general contractor on a ton-cost basis, which may give it an installation cost advantage. However, size and arrangement of the machine and individual mill conditions will largely determine the relative costs of the installation.

5. It requires less technical know-how for operation and maintenance, while showing excellent performance at medium machine speed and quite recently also in the high speed ranges.

6. It provides extreme sensitivity and accuracy of draw control, since the P.I.V.'s entire 400-per cent output speed range is being used to vary the machine section's speed by only 6 per cent.

7. Since modern power plants generate steam at high pressures, the turbine acts as a reducing station for the dryer steam, resulting in a very favorable heat balance.

8. The differential drive is capable of an extremely wide speed range, in excess of 10 to 1. For example, many of the new machines running heavy food boards in the 200 fpm range can also run paper weights up to 2000 fpm without any drive changes.

9. The mechanical drive has greater overload capacity, especially for loads of a few hours' duration.

10. The entire drive is located in the back side machine aisle, and no special room is required for controls.

11. The combination of differential drives with electric helper drives permits the application of rigid speed control, with torque control to other rolls on the same felt or wire.

Are there weaknesses of the mechanical differential drive?

While there were some critical comments expressed in the field with regard to the differential drive, it should be noted that these comments do not represent a consensus, nor were they expressed cumulatively. What may be regarded a weakness under one set of mill conditions may not necessarily be so under a different set of conditions.

Some of the comments are as follows:

1. The power requirements of the differential drive are a built-in property that cannot be drastically changed after the installation has been made, unless gear boxes are replaced. This, in addition to being costly, may present the problem of the new gear boxes not fitting into the lineshaft alignment.

2. The differential drives require a perfect lineshaft and gear box alignment. To maintain this alignment a reinforced substructure is essential for the drive's installation.

3. The differential drive installation requires a somewhat wider aisle than that needed by the modern sectional electric drive.

4. Since all sections are tied together, a transient load change at any portion of the machine tends to give a transient speed change to the entire machine. This is one of the basic reasons for today's desire for increased accuracy and transient response performance of turbine governors.

5. There are about 17 gears with their associated bearings in each speed control section requiring maintenance. However, these are all enclosed and automatically lubricated.

The sectional electric drive

The sectional electric drive as we know it today has electronic transistor or magamp regulators to effect extremely accurate and rapid response in speed control. While sectional electric drives date back as far as 1909, the first complete sectional drive equipped with electronic regulators was installed in a Riegel Paper Co. mill in 1941.

The next development in sectional electric drives was the multiple generator system in which each motor received its power from its own individual generator. This had the advantage of providing greater versatility of control of section operation and enabling the section motors to maintain their own constant speed irrespective of any load changes on any other section.

The performance of sectional electric drives is largely that of their controls. Accordingly, a tremendous effort has been made by manufacturers to simplify the circuits, improve the electronic tubes or, as in the case of magamp and the new transistor regulators, completely eliminate the electronic tubes. These improvements have resulted in an amazingly low downtime of paper machines due to electrical causes.

The use of electronic, magamp or transistor regulators has completely eliminated the slow response, with resultant poor transient performance, which until recently has been the main objection to sectional electric drives.

In the multiple generator system now all motors are regulated by a "speed" regulator or a combination of position and speed regulator. The

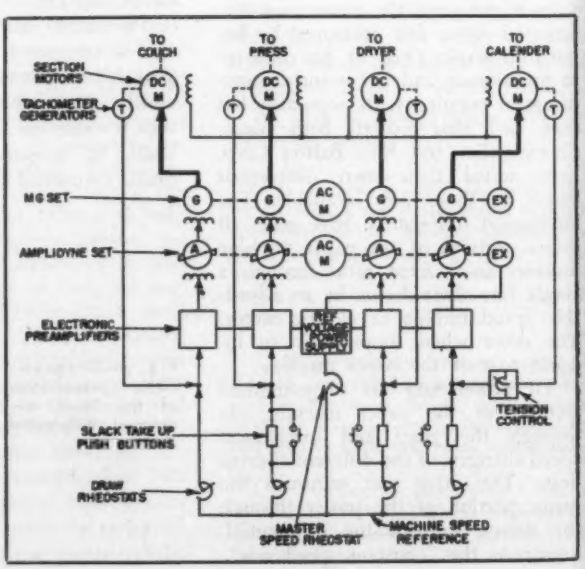

Fig. 3—Diagrammatic presentation of General Electric regulating system.

speed regulator compares the motor's shaft speed against a voltage reference on the control panel. Shaft speed is measured by a tachometer generator which generates a voltage proportional to the speeds of the motor shaft or the gear shaft. The speed-reference voltage is obtained from the electronically- or statically-regulated reference voltage supply. The output of a voltage comparison circuit is fed to a high-gain, high-power amplifying system consisting of (1) the magamp or (2) the electronic preamplifier, the amplidyne and the generator which supplies power to the motor armature. The speed is then automatically controlled by regulating the generator armature voltage.

At the slightest change of speed, the output of the tachometer generator sends a corrective signal to the amplifier to supply sufficient power to the motor armature in order to maintain correct speed. The high sensitivity of the system provides for remarkably accurate degree of motor speed control. Flow diagrams of General Electric and Westinghouse regulating systems are shown in Figs. 2 and 3. The latest G. E. drive uses a transistor preamplifier and magnetic amplifier to replace electronic tubes and amplidynes.

Basically, the components of the sectional electric drive consist of:

1. A section driving motor
2. Self-lubricating, helical speed reducing gears (when necessary)
3. Tachometer generator
4. Section generator
5. Amplidyne or amplistat (General Electric Co.) or magamp (Westinghouse Electric Co.)
6. Control panel with electronic or transistor preamplifier (General Electric Co.) or magamp (Westinghouse Electric Co.)
7. Operator's station for each section
8. A main direct current excitor
9. A reference-voltage supply
10. An operator's master cabinet common to all sections.

The operator's master speed control consists of a single control rheostat for the purpose of adjusting the speed level of the machine as a whole. The operator's section control cabinets contain the functional controls, i.e. section draw rheostat, ammeter, run-slow-stop, slack take-up, reverse pushbuttons and tension-adjusting rheostat.

Advantages of the sectional electric drive

Among the advantages claimed for the sectional electric drives are the following:

1. The electric motor places the power where needed at each section of the paper machine.
2. The adjustable voltage regulating system controls and regulates the speed of the machine permitting each section to perform to its best advantage.
3. It provides maximum flexibility —speeds and loads can be increased and sections may be added, removed or rearranged with a minimum expense and time loss and without requiring basic changes in the drive.
4. The sectional electric drive permits multiple indrives on large dryer sections. Electrically, it is possible to have 2-4 electric motors, operating in parallel, indriving at various points of large dryer sections.
5. The range of draw adjustment ($\pm 12\frac{1}{2}$ per cent) provided by the sectional drive is more than ample for all mill purposes. This permits use of different diameter rolls without changing drive equipment.
6. The compact electric drive unit occupies little space on the machine room floor.
7. The maintenance has been reduced to a minimum since (a) there are only two gears and bearings per section, (b) electrical units have been sectionalized for easy disconnect and replacement, and (c) all paper machine amplidynes are identical and interchangeable except for kilowatt rating.
8. Reports from recent installations show a drive availability of over 99.9 per cent, with lost time chargeable to electronic tubes less than 0.5 min. per day.
9. Magamp and transistor regulators have no tubes or moving parts and for that reason require less maintenance than any other type of regulator available.
10. The electronic preamplifier, with all units identical and interchangeable, is equipped with test points to simplify tube testing and circuit adjustment. Only three adjustments are now necessary: (1) for antihunt, (2) for balance of preamplifier, and (3) for setting maximum operating level.
11. Control and regulating circuits have been simplified and improved to give greater reliability, faster response, precise speed regulation and better stability.
12. Electrical braking provides faster stopping of the dryer sections.

Any weaknesses in sectional electric drives?

The main disadvantage of sectional electric drives as expresssed in the field is the fact that they are somewhat of a mystery to the majority of operating and maintenance personnel who find electrical equipment too complicated.

An economic disadvantage is that the installation cannot be made by the general contractor, as is the case with the mechanical differential drive, but must be done by an electrical contractor.

Conclusion

What drive should the paper mill select? Under present conditions the selection of drives seems to be a question of local mill conditions and individual preference. A mill that has a competent electrical engineering department seems to favor the sectional electric drive, while the mechanical differential drive is extremely popular with operators and maintenance personnel who generally have a preference for equipment that has mechanical moving parts and where any damage or cause of failure can be detected by physical senses. Both drives are providing excellent performance on modern high-speed machines.

It will be interesting to see to what extent the present attitude will be modified in the future. The trend is definitely toward greater instrumentation, and with greater instrumentation is bound to come a greater familiarity with and better understanding of electrical equipment.

It is also obvious that there will be continued progress and improvements in both the mechanical differential drive and the sectional electric drive to meet the increasingly more stringent requirements of the paper industry.

Sulfate Pulp Mill

(Continued from page 589)

On the dock a traveling stacker equipped with a movable boom receives the pulp from the 72-in. wide conveyor belt and feeds it into any of the tanker's nine holds through the boom's conveyor and swiveled spout. The pulp is loaded into the ship hold according to wood species.

The $5,000,000-tanker, known as the S. S. Duncan Bay, has a capacity of 800,000 cu. ft. or a load of 12,000-14,000 tons of wet pulp. The tanker is operating on a 10-day cycle, with actual loading time taking about one day. Transportation economies are achieved through quick loading and unloading.

Upon arrival in Antioch, the pulp is slushed with water to about 2 per cent consistency and pumped ashore to large stainless steel dewatering deckers.

The operation at Antioch will be described in Part II of this article.

Acrylic emulsions for paper coatings

Part II — Recommended coating formulations for specific types of coating processes

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IN FORMULATING a pigmented acrylic coating it is recommended that the clay slurry be made under full agitation to insure good dispersion. The clay should also be screened. If the system is a protein-acrylic or a starch-acrylic blend, the acrylic emulsion should be added as the last step with a minimum of agitation to reduce foaming.

The addition of a wax emulsion to the coating helps eliminate possible sticking, but only a minimum quantity should be used since wax reduces the printing properties of the coating as well as its grease resistance.

Casein, starch and alpha protein should be prepared in the manner recommended by the various manufacturers. In casein and alpha protein systems it has been observed that ammonia-cuts produce coatings having better water resistance and tend to foam less than when sodium hydroxide is used.

Dispersing the clay

The proper dispersion of the clay pigment in an acrylic system depends on both the dispersing agent and the mechanical methods used. The clay dispersion should be adjusted to a pH of approximately 9 with ammonium hydroxide (0.1 to 0.3 per cent based on weight of clay).

Typical clays used in formulating Rhoplex coatings are Premier or KCS clay, manufactured by Georgia Kaolin Co., Elizabeth, N. J., and Stellar and HT clay, manufactured by the Edgar Div., of Minerals & Chemicals Corp. of America, Metuchen, N. J. Any standard coating clay can usually be employed in a Rhoplex coating. Predispersed clays require less caustic than other types of clays. Calgon and Quadrafos are effective dispersing agents for clay systems. The alkali and dispersing agents should be dissolved in the water before adding the clay.

Champion coater formulation

Rhoplex B-15 or Rhoplex B-60A offer coatings of high solids and low viscosity with good mechanical stability which permit higher coating weights than are normally possible on this type of equipment. The thermoplastic nature of the Rhoplex emulsions is particularly advantageous in promoting high-gloss, smooth coatings that give excellent printing characteristics. The following is a typical starting formulation:

Clay	90	parts
TiO_2	10	parts
Calgon or Quadrafos	0.3	parts
Ammonium Hydroxide	0.15	parts
Protein or Casein (solids)	3.5	parts
Rhoplex B-15 (solids)	10.5	parts
TOTAL SOLIDS	56	per cent

Wet stack finishing is essential to obtain the highest gloss.

Size press formulations

Size press formulations based on a Rhoplex emulsion can vary rather widely both as to pigment composition and binder content. The use of an acrylic binder has made it possible to operate the size press at higher coating weights, thus effectively utilizing the size press as a coater. A typical size press formulation is:

Clay	100	parts
Protein or Casein (solids basis)	10	parts
Rhoplex B-15 (solids basis)	10	parts
Ammonium Hydroxide	0.15	parts
Calgon or Quadrafos	0.3	parts
TOTAL SOLIDS	30 to 40	per cent

The normal viscosity of systems used in the size press varies from 100 to 800 centipoises, depending on solids. Coating weight applications with this formulation will generally range from 3 to 5 lb. per ream (3000 sq ft).

Attempts to use Rhoplex systems at 60 and 65 per cent solids have been unsuccessful on this type of equipment. The failure can be attributed to the lack of sufficient water in the coating to permit adequate flow during the drying process since acrylic coatings generally have fast rates of water release. Notable success has been obtained with a starch-Rhoplex formulation in

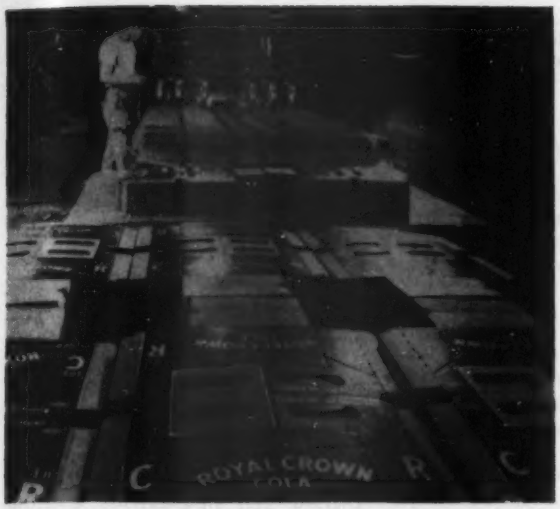


Fig. 9—Acrylic binder for pigmented base coat improves the print quality of cartons.

Fig. 10—Good water resistance is another advantage provided by acrylic-bound coatings.

which Penford Gum No. 300 has been substituted for the protein.

Calender stack formulations

In numerous efforts to coat on the calender stack, patterning has presented a problem. Attempts to use an all-Rhoplex coating on the calender stacks have failed, because of the fast-drying characteristics of the acrylic resins. A formulation developed in the laboratory that minimizes the patterning effect, and which also shows desirable flow properties necessary for this type of coating, is as follows:

Clay	100	parts
Penford Gum No. 300 (solids basis)	10	parts
Rhoplex B-15 (solids basis)	5	parts
Calgon or Quadrafos	0.3	parts
Ammonium Hydroxide	0.15	parts
TOTAL SOLIDS	28 to 30	per cent

Formulations for roll coaters, air-knife coaters and brush coaters

The acrylic coatings are well adapted for application on the roll coater, air-knife coater and brush coater. These coaters normally do not require high-solids coatings to achieve the desired coating weights. Usually the coated sheets obtained from this type of coater are supercalendered or brush finished. When coatings are mechanically finished, the properties of the acrylics contribute appreciably to the high gloss and smooth surfaces.

The outstanding mechanical stability of the Rhoplex coatings is of great importance in view of the cascading, pumping and shearing to which the coatings are subjected. A typical starting formulation for coaters of this type is as follows:

Clay	100	parts
Rhoplex B-15 (solids basis)	8	parts
Protein or Starch (solids basis)	8	parts
Calgon or Quadrafos	0.3	parts
Ammonium Hydroxide	0.15	parts
TOTAL SOLIDS	approximately 40	per cent

Knife-blade coater formulations

One of the most desirable properties of a Rhoplex binder in a knife-blade coater is its high mechanical stability when subjected to the high shear of the knife blade. The ability to formulate high-solids coatings with Rhoplex B-15 or Rhoplex B-60A is important in this type of coater. The incorporation of protein or starch contributes substantially to the flow characteristics of the coating in this case. A recommended formulation is:

Clay	80	parts
TiO_2	20	parts
Calgon or Quadrafos	0.3	parts
Ammonium Hyroxide	0.15	parts
Protein or Starch (solids)	1.0	parts
Rhoplex B-15 (solids)	9.0	parts
TOTAL SOLIDS	65	per cent

Greaseproof coatings

Rhoplex B-15 and Rhoplex B-60A are good film-forming materials when dried at room temperatures. However, these acrylic emulsions may not be used alone because the resulting films are too tacky for normal use. To eliminate this tacky condition the use of clay or a water-soluble resin such as Amberlac 165, incorporated into the system, has proven successful. Both methods have found commercial acceptance.

Greaseproof clay coatings

Slightly opaque, greaseproof coatings for paperboard, which are non-

Fig. 11—High gloss and excellent tack resistance are obtained with acrylic paper coatings.

blocking and can withstand scoring, can be made by using a combination of Rhoplex B-15 and an ordinary coating clay. A suggested formulation is as follows:

Clay	70 parts
Water	30 parts
Calgon or Quadrafos	0.2 parts
Rhoplex B-15 (46% solids)	82 parts

To prepare this formulation, the clay should first be dispersed in water. The Rhoplex B-15 is then added with constant stirring. The resulting coating contains approximately 60 per cent total solids, and has a viscosity of approximately 70 centipoises (Brookfield, 60 rpm, 25°C). Viscosity may be controlled by the addition of dilute ammonium hydroxide; increasing pH of the system will result in a higher viscosity. Coating weights of 5 to 7 lb. per 1000 sq. ft. are desirable, and a series of lighter coats proves more effective than one heavy coat. Greaseproof coatings of this type show good resistance to turpentine and vegetable oils, both flat and after scoring, and are resistant to blocking when placed face-to-face at 210°F and 50 per cent relative humidity under 1 psi pressure for 16 hrs. At 180°F (100 per cent relative humidity) under similar conditions of pressure and time the coatings also show no tendency toward blocking.

Greaseproof water-soluble resin coatings

Good greaseproof coatings can be formulated with water-soluble resins such as Amberlac 165. This ammonium salt of a synthetic resin complex, supplied as an aqueous solution, may be used as an additive to a film-forming resin, although it does not form a film itself. Its principal function is to prevent blocking (sticking) of clear thermoplastic coatings. Amberlac 165 may be used in ratios of 100 parts of Rhoplex emulsion to 30-40 parts of Amberlac 165 (solids in solids). If Rhoplex B-15 is used, the coating will not be quite as resistant to blocking as when Rhoplex B-60A is used; but coatings based on Rhoplex B-15 will show better flexibility and resistance to scoring. The preparation of a Rhoplex-Amberlac 165 coating is quite simple and merely involves adding the Amberlac 165 to the Rhoplex emulsion, with mild agitation. Depending on equipment used and the coating properties required, it is sometimes advisable to add a wax emulsion. A recommended formulation is:

Rhoplex (solids)	100 parts
Amberlac 165 (solids)	40 parts
†Microcrystalline Wax Emulsion (solids)	14 parts

The incorporation of the wax emulsion prevents picking on driers and calenders and "drag" in the coating, thereby permitting slip characteristics in the automatic pasting machines. The wax also greatly improves the scuff resistance of the final coating.

Color formulations

The compatibility of the Rhoplex emulsions with a wide variety of colored pigments makes them particularly useful in formulating colored coatings. A formulation for a colored coating showing a very good covering power and intensity of color is:

Clay	78.5 parts
Titanium	19.6 parts
Monastral Blue WDBP-192-E (DuPont)	1.9 parts
Rhoplex B-15 (solids)	16 parts
Ammonium Hydroxide	0.2 parts
Calgon or Quadrafos	0.1 parts

At a 60-per cent total solids level this formulation should be satisfactory for application by air-knife, size press and other types of coating equipment where a relatively low-viscosity system is required. The viscosity can be increased by adding small amounts of protein, or by increasing the solids content. Numerous other pigments can also be used with equal success in this formulation. The wet rub resistance of the colored coating compares to that of a regular clay-titanium coating. The best resistance to wet rub is obtained when the coatings are mechanically finished.

Metallic coatings

Metallic coatings containing Rhoplex B-15 or Rhoplex B-60A have been successfully prepared. In particular, Rhoplex B-15, which has a pH 6 to 6.8, readily lends itself to the formulation of metallic coating systems.

Foam control

Three very good defoamers for Rhoplex coatings are Foamex*, tributyl phosphate and Nopco 1497-V**. The defoamers should be added in small quantities — 0.05 to 0.1 per cent based on the total solids of the coating. Additional quantities of defoamer should be added only when the foam condition demands.

†Alwax 253C, American Cyanamid Co., or Paracol 404C, Hercules Powder Co.

*Glyco Products Co., Brooklyn, N. Y.

**Nopco Chemical Co., Harrison, N. J.

The elimination of free falls, cascading and air inlets into pumps will keep the foam to a minimum. The coating formulation should not be severely agitated in the mixer after the Rhoplex emulsion has been added. When making small batches of coating in large kettles, the mixer should be used in an intermittent motion once the acrylic resin has been added to the system so as to minimize the formation of foam.

Control of exposed shallow areas

Shallow areas of coating should be avoided. If this is impossible, then the exposed area can be hooded to prevent the evaporation of water at the film surface. Because acrylic resins tend to release water rapidly, shallow and slow-moving areas in the coating tend to skim over.

Eliminate top coatings

Studies reveal that the water-soluble polymers should not be applied over a Rhoplex-bound coating. If materials such as carboxymethyl cellulose, polyvinyl alcohol and starch are applied over an acrylic coating, then the purpose of using synthetic binder (good ink receptivity and print characteristics) is defeated. However, zinc sulfate can be added at the calender stack in place of water, particularly if the coating is composed of Rhoplex B-15 or Rhoplex B-60A blended with casein or protein. The zinc sulfate improves the water resistance of the coating.

Broke recovery

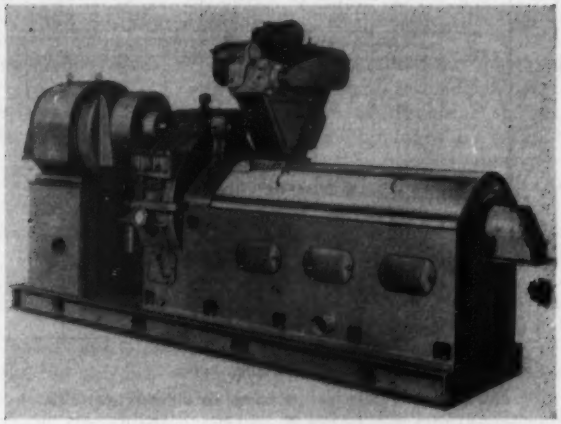
Broke recovery is not normally a troublesome problem. However, when the binder is solely acrylic and the coating weight is extremely heavy, the coating tends to be released from the fibers in agglomerates, rather than in discrete particle form. Small amounts of protein or starch present in the coating tend to eliminate this condition, and broke recovery is no longer a problem. A small amount of bentonite or similar material, added to the broke beater, is also effective.

Clean-up

A Rhoplex emulsion, once permitted to dry on a kettle or floor, is difficult to remove and should be removed before it has dried. The ordinary solvents will not dissolve a Rhoplex film, though alcohol will soften the film. Should it be necessary to clean rollers or any part of the coating equipment, alcohol is recommended. Pigmented acrylic coatings containing insolubilized protein or starch offer no difficulty in clean-up.

Bauer's new No. 560 Pressafiner

M. E. GINAVEN* and
ALBERT H. ADAMS**



Exterior view of No. 560 Pressafiner

▶ A new Pressafiner has been developed featuring single-shaft and single-gear train and complete interchangeability of all shaft collars and worms.

IT IS A WELL established fact that the screw press has a unique fiberizing action in refining wood chips and agricultural residues, and that it is excellent for dewatering. Yet it was not until 1952 that a commercially successful application was made with four machines in the production of N.S.S.C. pulp.

Preliminary research with wood chips and bagasse prior to that installation indicated the screw press would provide extraction of liquid, a primary fiberizing because of the compacting and rolling of fiber bundles under controlled pressures, and a mild steaming or vapor phase heating effect on the material being treated.

1. Basic design must follow theoretically sound principles of extraction and fiberizing, which can be verified by laboratory evaluations.
2. The machine must be of utmost simplicity in design and assembly, with good accessibility for maintenance purposes.
3. It must have extreme ruggedness in construction.
4. The design must provide for complete safety of the operating and servicing personnel.
5. The best available abrasion- and corrosion-resisting materials should be used wherever fiber, liquors or vapors contact the machine parts.
6. Adequate protection against serious damage to equipment by foreign matter should be provided.
7. The rotating parts of the machine must be continuously supplied with filtered oil and fully sealed against liquor and dirt.
8. The machine capacity should be adequate to handle any commercial requirement with a reasonable number of units. The objective for 75-per cent yield N.S.S.C. chips is 100 A.D. tons per day, with power consumption up to 2-hp days per ton.

However, at least 10 other benefits were noticed in the commercial processing of high-yield pulps with the screw press. As most of these extra advantages were not anticipated, it was decided to embark on a more thorough research program.

The first installation proved beyond a doubt the need for continuous screw presses. It also proved, to us, that further study would lead to design improvements, more efficiency and more complete control of variables. One phase of our research included the study of laboratory results to forecast commercial operations with consistency and dependability.

The basic research work that led to the development of our No. 560 Pressafiner — designed specifically to meet modern industrial pulp-processing requirements — is described in this article.

At the Fifth Annual Pulp & Paper Conference at the University of Florida, we reported on our Pressafiner development program by listing the commercial achievements of some of these machines and also pointed out mechanical limitations of the equipment offered at that time. Concurrently, we were engaged in a broad laboratory study of pressing fundamentals and a basic evaluation of mechanical designs. We concluded our background studies with these eight requirements for a screw press to merit commercial acceptance by pulp processors:

Basic research work

To explore the fundamental phenomena of chip and fiber pressing, a simple batch-type press was set up in our Fiber Products Laboratory.

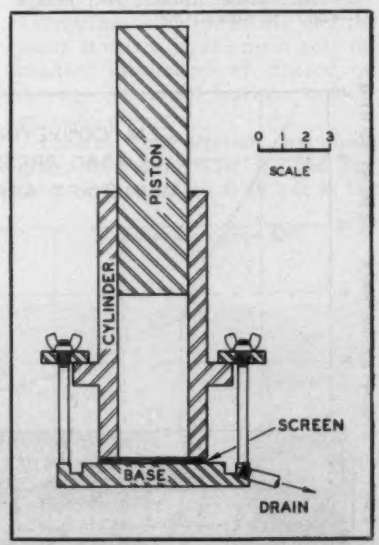


Fig. 1—Laboratory batch pressing apparatus.

*Vice president, machinery sales, Bauer Bros. Co., Springfield, Ohio.
**Sales engineer, Bauer Bros.

This paper refers to continuous screw presses manufactured by Bauer Bros. Co. and recognized commercially as the "Pressafiner" and "Impressafiner".

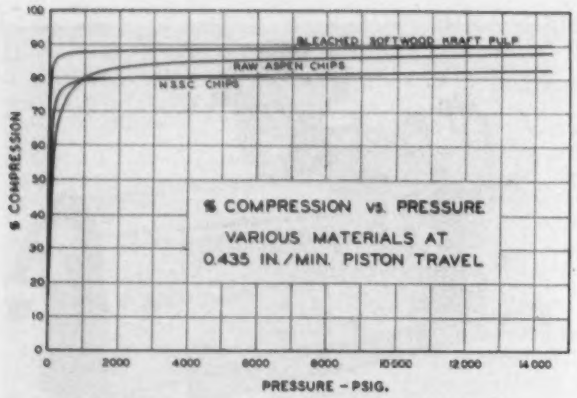


Fig. 2—Variation in load to compress different materials.

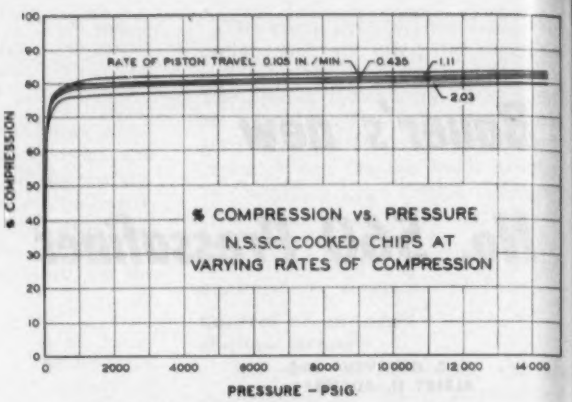


Fig. 3—Batch pressing tests at different loading rates.

This equipment, designed and assembled by Edwin V. Kemp*, consisted of a cylinder and piston arrangement with a suitable drainage screen and spout, as shown in Fig. 1. The device was mounted on a metallurgical laboratory Riehle Beam Tester to provide means of applying measurable loads.

Information obtained with this equipment indicates that frictional and compressability characteristics of the material to be processed are of basic importance in press performance. These two items, along with the mechanical efficiency of the press drive and the electrical efficiency of the driving unit, comprise the controlling factors which determine the power required for any given operation.

As would be expected, the loading required per unit of compression becomes greater as compression ratios increase. This is shown graphically in Fig. 2.

*Assistant director, research, Fiber Products, Laboratory, Springfield, Ohio

This graph also shows variation in load required to compress different materials. These data establish the need for design features that will permit variation in compression ratios for different feed materials and balancing of compression throughout the press for any given feed to distribute loading on the main shaft and provide proper feeding characteristics.

Batch pressing tests made at different loading rates (as plotted in Fig. 3) also show that the loading required to obtain a given compression increases as the loading rate increases. This emphasizes the importance of uniform and gradual increases in compression and was a factor in engineering the over-all dimensions of the new press.

Fig. 4 shows schematically how compression ratios were balanced throughout the first machine to provide for uniformly-increasing increments of compression.

In addition to developing information useful in designing for uniformly-increasing increments of compression, the batch pressing tests and theoretical calculations provide some knowledge of the relationship between compression ratio and solids content of the compressed material. With this information and the plot of per cent compression along with the Pressafiner shaft, the change in solids content and amount of liquor removed as the material is compressed can be predicted.

Fig. 5 shows the relationship between per cent compression and solids content after pressing with various feed consistencies. These data were derived from calculations based upon the compression ratios shown in Fig. 4 and analysis of liquor removed from the N.S.S.C. chips used for batch pressing tests. This material was used because the prototype machine was intended to press commercially cooked N.S.S.C. chips.

The accuracy of these calculations is shown in Fig. 6, where the calculated curve for a 42 per cent O.D.

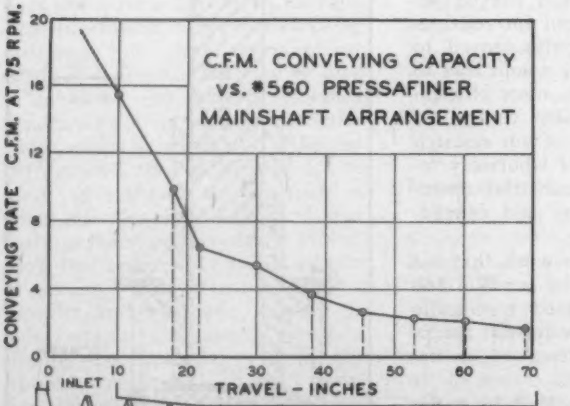
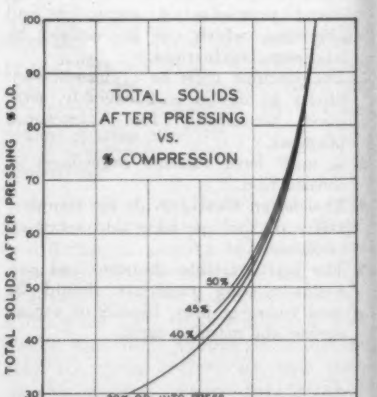


Fig. 4 (left)—Balancing of compression rate.

Fig. 5 (right)—Relationship between per cent compression and solids content.



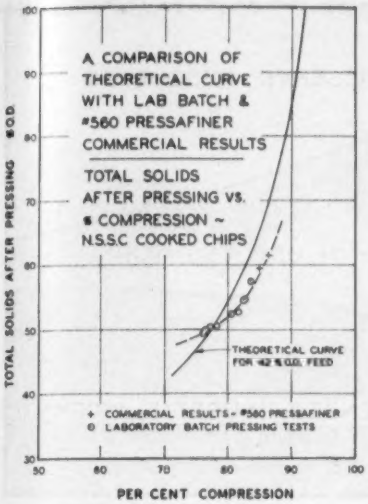

A COMPARISON OF THEORETICAL CURVE WITH LAB BATCH & #560 PRESSAFINER COMMERCIAL RESULTS
TOTAL SOLIDS AFTER PRESSING VS. % COMPRESSION ~ N.S.S.C. COOKED CHIPS
THEORETICAL CURVE FOR 42 % O.D. FEED
+ COMMERCIAL RESULTS - #560 PRESSAFINER
⊙ LABORATORY BATCH PRESSING TESTS
TOTAL SOLIDS AFTER PRESSING % O.D.
PER CENT COMPRESSION

Fig. 6—Comparison of theoretical curve with laboratory batch pressing tests.

feed material is plotted along with points obtained in laboratory batch pressing tests. Results of commercial operation obtained after the No. 560 Pressafiner had been completed and put into operation are also included on this graph.

Mechanical design program

While the laboratory program served as an excellent guide to the establishment of proper compression ratios and drainage areas, the translation of ideas into commercial equipment was the major problem. As outlined in our set of specifications, the machine would be basically unlike any existing screw press built in this country or abroad and would require considerable pioneering in design and metallurgy. Preliminary basic ideas for the equipment were submitted to John L. Ostborg* for stress studies and arrangement of major components. Final design and detailing of all parts was a cooperative effort with the Bauer engineering staff participating.

Referring to the sectional drawing, Fig. 7, of the new machine (Bauer No. 560), we briefly summarize the mechanical features.

To achieve simplicity, we designed a base member capable of carrying all longitudinal stresses in a unit weldment. No tie rods, external braces or loose pieces are employed. The entire interior of the base is made of No. 316 stainless steel. The exterior and gear housing is finished with a hot-sprayed plastic coating. The clean design of the base interior makes possible the unimpeded gravity flow of liquors containing high amounts of chemical solids from either side or both sides of the machine.

The solid stainless steel feed and main cages are split on the horizontal centerline. This provides maximum access to shaft assembly and screen bars, and permits a quick and extremely safe removal of parts for service. A hoist and pneumatic impact wrench (for cage bolts) can be readily suspended above the cage area.

The shaft assembly of the No. 560 Pressafiner is unique in two features. First, the initial compaction and removal of voids in the chips or other materials being fed is accomplished by a truncated conical feed worm (patent applied for), operated at the same speed as the main shaft assembly. Flight pitch variations permit initial displacement ratios with the main shaft in the range of 1.5-to-1 up to 3.6-to-1, which were the limits of ratios established by laboratory compression tests for several commercial materials.

This concept of design makes it feasible to use a single shaft and a single gear train. There are also other advantages, as the great flight depth at the large end of the feed worm makes for easy feeding of large pieces and low-consistency stocks. A counter-rotating pair of feed screws (patent applied for) lightly compress incoming materials into the conical feed worm, but only on the downward-moving side of the worm.

While the conical cage section posed some design and production problems, the results achieved have more than justified the solutions of the manufacturing requirements. The design offers excellent drainage advantages over conventional screw presses and permits extraction to equivalent levels of dryness with far less power input.

A second advantage of the new design is the complete interchangeability of all shaft collars and worms. This provides for maximum flexibility in extraction, with a minimum number of parts.

It should be pointed out that final extraction control is made by various diameters of discharge sleeves, which are interchangeable without dismantling the press (patent applied for). We have found from experimental work in our laboratory and in field tests in four mills that this control is more effective than an adjustable cone and uses substantially less power to do the same job of liquor extraction. The No. 560 Pressafiner includes a discharge elbow with weighted inspection door (for samples, etc.) to confine the pressed material for cleanliness and safety.

To remove a shaft from the No. 560 Pressafiner requires only 18 in. of space in front of the press.

Twin screw feeders are interchangeable with conventional feeders. Both have Triple-Air-Gap permanent magnets built-in.

Standard foot-type motors (T.E. F.C. or splash-proof design) are used for either direct connection via flexible coupling or by poly-vee belt drive.

All parts have been generously "over-designed". The gear train is capable of four times the motor load. The shaft is solid heat-treated stainless steel. Feed cage, main cage and all screw parts are also solid stainless steel. Feeder body, feed control screws and twin screws are stainless fabrications. The base interior is stainless steel, and liquor discharge pipes (remote from gearbox) are 4-in. stainless flanged pipes.

The gear box is well sealed against ingress of liquor or dirt. Lubrication is by forced oil, and the pump is driven by the main gear for positive lubrication of filtered oil through jets to all bearings and the gear and pinion.

Careful consideration has been given to maintenance of the machine. All parts are as simple as the

(Continued on page 620)

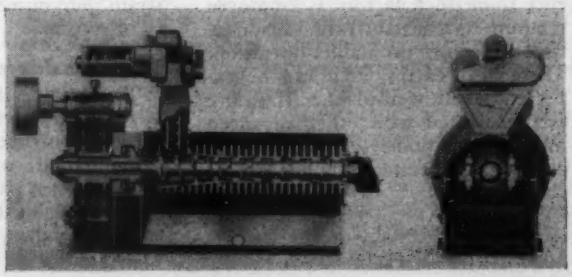


Fig. 7—Sectional drawing of No. 560 Pressafiner.

*President, Ostborg & Associates, Springfield, Ohio

Lighting in the paper industry*

D. R. PHILLIPS**

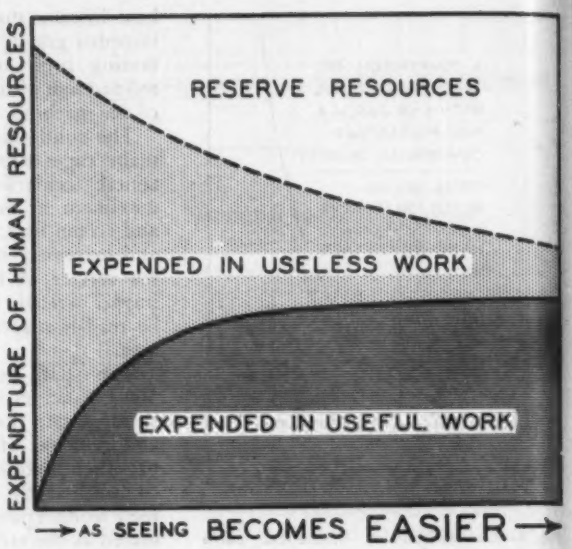


Fig. 1—The effect of lighting level on production and expended energy.

Part I — Basic considerations, lighting in general manufacturing and industrial areas.

IN THE LAST few years new developments in lighting equipment and light sources have almost revolutionized the design of lighting systems—not only in the paper industry but in all industrial areas. These developments have done much to improve the visibility and comfort of industrial lighting systems—and do it at a lower cost than was possible before.

Such improvements are particularly needed in the paper industry, because lighting is such an essential part of papermaking.

Many benefits of good lighting are intangible, difficult to determine by actual tests, but equally as important. These benefits, which must vary from plant to plant, are in most cases probably more important in a given plant than those that can be measured directly. Their influence upon such factors as employee relations is constantly in the direction of more profitable operation. These are "extras" that can be expected when well-planned lighting is coordinated with other advanced management policies.

Fig. 1 illustrates two benefits of lighting insofar as expenditure of human energy is concerned. Productivity increases as illumination increases—rapidly at lower levels and at a reduced rate for very high levels. The top curve shows how the expenditure of human energy decreases with increased levels of illumination. It continues to diminish long after the output curve becomes essentially flat. This indicates that for most tasks a lighting level is reached where there will be very little additional increase in output. This often indicates a limit of manual dexterity, rate of understanding, etc., rather than lack of improvement in seeing. It is still desirable to improve the seeing condition beyond this point. If the worker can perform his task with less effort, he can carry out his duties with greater safety and accuracy and with less strain, nervousness, and fatigue.

Basic considerations

The specifications of lighting for any manufacturing process should be related to requirements suited in general to its nature and with special reference to characteristic seeing tasks. If seeing tasks are difficult or prolonged, then not only high levels of illumination are required, but specially adapted supplementary lighting may be necessary. Basic factors involved are the size of detail to be observed, its color and contrast with its background (does it stand out, or does it blend so that it is hard to see), the length of the individual seeing operation, extent to which the task is repetitive (is it intermittent or continual, is it moving), and whether color discrimination is involved. Thus, the lighting of papermaking processes may fall into two general classifications: (1) Those in which the visual tasks are not unduly severe (which may be adequately served by a good system of general illumination), and (2) those requiring special treatment.

Manufacturing areas

For the general manufacturing processes the lighting system should not only give a good distribution of light over the area, but shadows today by lighting systems employing fluorescent lamps. They combine high efficiency with low brightness (for eye comfort) and good color rendition. The lighting recommendations usually warranted for areas of this type are in the 50-100 foot-candle range and generally utilize two-lamp fluorescent equipment. The standard cool white lamps are

*Presented at the A. I. E. E. Pulp & Paper Industry Conference.
**General Electric Co.

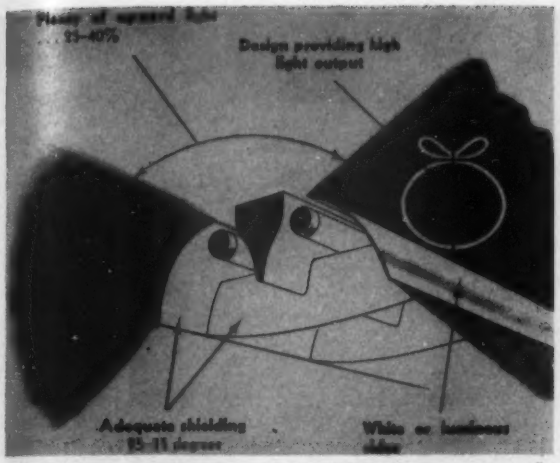


Fig. 2—Modern industrial lighting fixture.

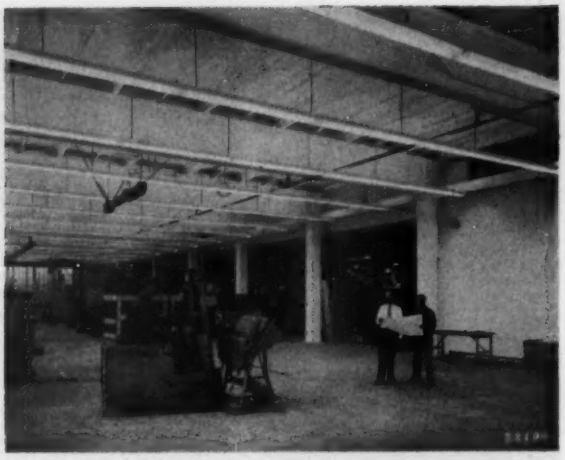


Fig. 3—Seeing comfort of workers is much improved.

usually used except in the critical color discrimination area. The lighting problem in these areas will be discussed under the heading "Color Matching".

In relatively high bays (above approximately 25 ft.) filament or mercury lamps, or combination of filament and mercury, are often best adapted. In the past they have had the advantage of reduced maintenance costs over fluorescent lamps even though their efficiency is lower. Recent developments in fluorescent lamps, however, make them more attractive for use in high-mounting applications. Two years ago a high-output, 8-ft. fluorescent lamp was developed. This lamp is the same size as the 96T12 slimline except it has a recessed double-contact single-pin type base, which is designed to be used with matching push-pull type sockets. Its light output is 44 per cent greater than that of the 96T12 slimline, which enables it to provide at a lower overall cost.

In May 1956 a Power-Groove lamp was announced. This in the 8-ft. size has almost twice as much light output as the high-output lamp. These developments offer reduced maintenance costs while retaining the high efficiency of fluorescent lamps.

One of the aspects that may influence the choice of a particular light source for a general lighting system is reflected glare. For example, the use of high-brightness sources such as mercury of filament lamps in the calendering areas is usually undesirable due to the high-brightness specular reflections from the polished surfaces of the rolls.

Light conditioning of manufacturing areas

Lighting of industrial areas has until recently too often been handled as a problem in obtaining a certain footcandle level with often little consideration of visual comfort. Present trends indicate a much more acute realization of the importance of the real advantage of providing pleasant visual environments, Improvements in comfort are achieved by better lamp shielding, higher room reflectances and better control of room brightnesses.

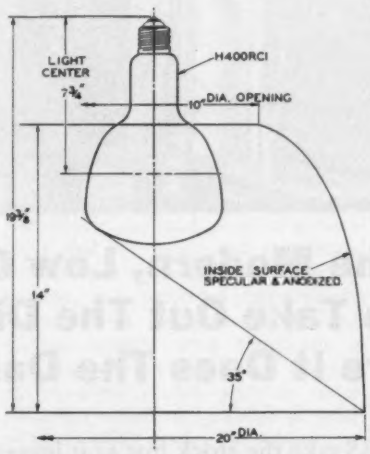
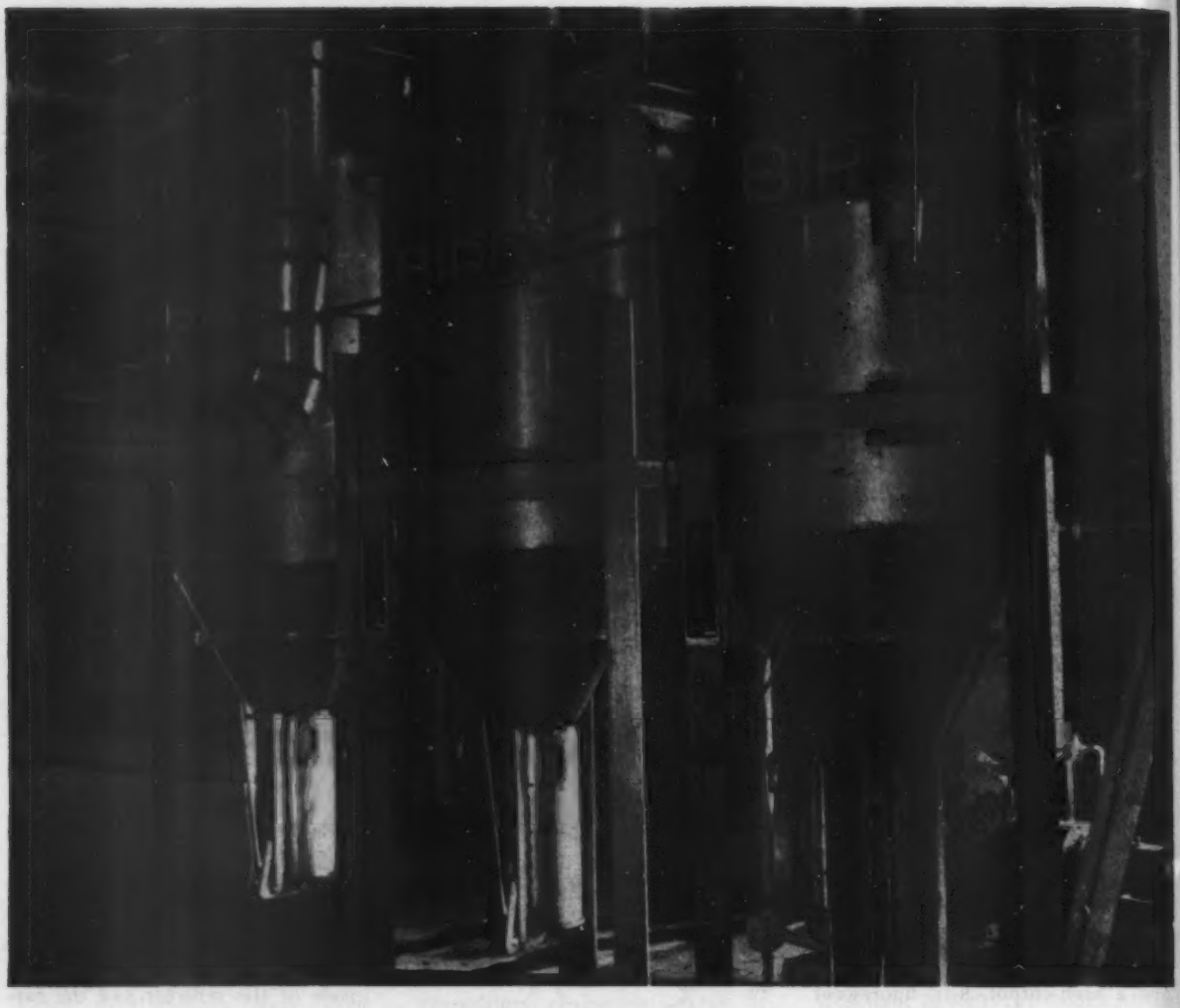


Fig. 4—A new type of mercury and filament fixture.

Industrial lighting equipment and methods have been changed greatly in the past few years in order to provide the modern factory worker with the high-quality lighting he needs. The prototype modern industrial lighting fixture (Fig. 2) has a substantial component of upward light in order to balance the brightness in the overhead zone. This opening in the top also substantially improves the maintenance characteristics of the unit, since dust and dirt can pass through the fixture instead of collecting on the reflector. These modern fixtures also have high efficiency because much of the light that was previously trapped between the lamp and reflector can now get out of the unit. Also, the lamps operate more efficiently since air currents passing through the fixture cool the lamps. The outside of the reflector is finished white to help balance the brightness between the inside of the reflector and the surrounding area. The lamps are also adequately shielded. These new types combined with light finishes on the room surfaces and machines do much to improve the seeing comfort of the workers (Fig. 3). Here we can compare the old with the new. The footcandle level on the work in the two areas is not much different (about 50 footcandles in the old area and 70 footcandles in the new), but notice the difference in seeing comfort.

The great improvement in comfort obtained with the new types of fluorescent fixtures has led to the development of new types of mercury and filament fixtures (Fig. 4). The experimental aluminum high-bay fixture shown here has many of the features of the fluorescent units, i.e. upward light, good shielding and good maintenance. Tremendous improvements in comfort are possible with units of this type. They are now commercially available and are expected to greatly improve the lighting of high-mounting areas.



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CURRENT COMMENTS

Higher sales, lower incomes . . . a good fourth quarter . . . and arson

by WARREN B. BULLOCK

The cost-price squeeze, which became so apparent in the first months of the year, has been the subject of many of the semi-annual reports of the major paper companies. In a majority of the reports stockholders were told of higher dollar sales but lower net incomes, as compared with conditions a year ago.

A sign of the times was the cutback in production of newsprint paper in Canada by four important companies, coupled with the announcement by the American Newspaper Publishers Association that stocks in the hands of publishers were higher than at any time in the past 13 years.

The United States Senate killed a proposal for a Federal Trade Commission investigation into the production and distribution of newsprint. Production of newsprint in July in North America reached an all-time high for that month, no small feature of this increase being due to the rapid growth of the United States newsprint industry, which had been in a near-vacuum for so many years. In the face of such conditions Congressional action was unnecessary.

A turn for the better

Despite financial reports, there is a growing sentiment in industry circles that there may be a turn for the better in the fourth quarter of the year. A hint of this possibility is seen in the statistics for the second quarter, which indicate a slight upward turn in the paper field as compared with the first three months.

In the paperboard field there has been some strengthening as a result of a trend toward larger sales of packaged merchandise. The slump in the construction industry, however, has had an adverse effect on the market for building boards.

Nevertheless, all the horizon is not black with storm clouds. Long-range forecasts by business and governmental agencies are optimistic. In a survey of the future, nine out of 10 industrialists representing companies with assets of 27 billion dollars predicted that their sales would climb anywhere from 25 to 300 per cent—but in the next 10 years. The trend, they believe, is already under way. Some even expect their net profits in the final quarter will come back to the figures of a year ago. These estimates are made through such agencies as Dun & Bradstreet. Such industrial prosperity cannot fail to benefit the paper industry.

Up 40% by 1965

The United States Department of Commerce gives a similar forecast of the future, but in terms of volume rather than dollar values. According to this survey, the demand for paper in 1965 will reach 43,800,000 tons, a 40-per cent increase over the output of paper and paperboard in 1956. This report is the government's contribution to the joint effort of government and the paper and paperboard industries to combine actual figures of present and projected papermaking capacity with the probable demand. Earlier statistics were significant in that they definitely indicated a capacity in some grades—such as newsprint—in excess of probable demand, while in other grades the statistics indicated that increased capacity would not be sufficient to meet the demand, as in the case of magazine papers. The prospective shortages did not all materialize when general business conditions seemed to slacken during the middle months of the year. As of today there is no shortage in any grade and a material over-supply in others.

Overseas expansion

The first session of the present Congress adjourned without any definite action on bills affecting the paper industry. Many bills were allowed to rest over to the second session, several of them pertaining to the foreign trade field. Efforts to amend the Anti-Dumping Act, for instance, resulted in violent protests from industries seeking adequate tariff protection. The Administration proposals to amend the law, however, were given the official support of the paper industry.

The necessity for American industry to expand abroad as a means of scaling the economic wall being erected against the United States by the new European economic union has been accentuated by a statement from one outstanding industrialist. His company will set up foreign subsidiaries. Willard F. Rockwell Jr., president of Rockwell Mfg. Co., was the first to announce a formal method of coping with the new European combine. His company will establish plants throughout the projected free-trade area. He envisages the new economic union as a fertile field for future operations, but only by investment in plants within the European group of nations. Rockwell, with over 20 United States plants for the manufacture of meters, power tools and the like, is already negotiating for plant facilities abroad. He feels that American manufacturers will be unable to share in the lucrative foreign field unless they actually operate plants abroad.

Arson in the forest

A Florida forest fire prevention conference, held at the request of the governor of that state, sees more stringent control of forest fire conditions as absolutely essential. The paper industry's interest in the problem was shown by the fact that the governor designated Justin R. Weddell of Pensacola, formerly of St. Regis Paper Co., as chairman of the conference. State officials told the conference that more than half the fires in Florida forests are caused by arsonists, and that there are as many as 1000 persons deliberately setting such fires. More aggressive prosecution of offenders was one of the steps recommended to meet this menace.

Financial Reports

Paper mill securities dropped with the rest of Wall Street to the lowest point of the year in trading on September 10. In some instances the drop in paper mill stocks was wider than in some of the more popular issues—probably because of the excessive en-

That's a good question, and a fair one.
And here's the answer: *You'll make more money.*

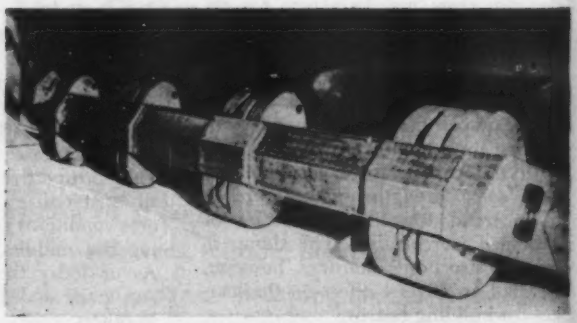
Here's why:

Every day in a major paper mill, the Hurletron Automatic Moisture Control is increasing production by one half percent. At the same time, a better quality and more uniform paper is produced. Because of this increased production and the resulting better quality product, the Hurletron Automatic Moisture Control paid for itself within four months.

The Hurletron system uses an entirely new concept in moisture control, and it's successful. As the system controls moisture, it also measures, indicates, and records, providing your operators with an accurate, visual production picture at all times.

Ideal for both Fourdrinier and cylinder machines, the Hurletron system operates efficiently and successfully on all types of paper and board.

Add it all up. The Hurletron Automatic Moisture Control system gives your plant increased production, improved quality, and lowered costs with no increase in stock requirements. Write for your brochure today and find out about the Hurletron Automatic Moisture Control as well as the complete package that Hurletron offers.



Pictured above are the Gauging Heads of the Hurletron Automatic Moisture Control.

HURLETRON

Electric Eye Equipment Company

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Current Comments . . .

thusiasm of investors in these securities a year ago, when all the talk was of expansion and new construction.

Net Incomes

Allied Paper Corp.—Net income for the first half, $600,150; a year ago, $1,636,287, when a carry-over of previous loss eliminated income taxes.

Celotex Corp.—Net income for nine months to July 31, $2,693,431; a year earlier, $4,565,561.

Mead Corp.—For 12 weeks ended June 16, $2,853,652; a year ago, $3,183,575.

Minnesota & Ontario Paper Co.—For the first half, $3,003,516; a year ago, $4,140,659.

Nekoosa-Edwards Paper Co.—For half year, $1,726,000; a year ago, $2,126,519.

Oxford Paper Co.—For the quarter ended June 30, $736,642; a year ago, $1,190,935.

Rayonier Inc.—For six months, $3,894,410; a year ago, $8,005,484.

Riegel Paper Corp.—For 26 weeks ended June 30, $1,442,046; a year ago, $1,799,279.

Sutherland Paper Co.—For the first half year, $1,937,395; a year ago, $2,127,844.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Sept. 10, 1957	Aug. 9, 1957
Celotex	29¼	32¼
Same Pref.	17	°17-17½
Certain-Teed	8⅛	8¾
Champion P & F	35¾	36⅜
Same Pref.	94	°89¾-90
Chesapeake	°25⅛-25⅜	25⅝
Container Corp.	17½	18
Same Pref.	85	87
Crown Zellerbach	46	52⅜
Same Pref.	°88½-89¾	°86-89
Eastern	22	24⅜
Federal Paper Board	33¾	34⅝
Same Pref.	18¼	°18½-18¾
Fiber Paperboard	25¼	29
Same Pref.	°92-94¾	°101-102
Great Northern	63¼	70
Hammermill	30	32
International	88⅝	102
Same Pref.	°83-86	82-85
Kimberly-Clark	457/8	48¾
McAndrews & Forbes	267/8	°28-28½
Marathon	24¾	27⅛
Masonite	28¼	30
Mead	33¾	34⅝
Same Pref.	84½	°85¾-86
Minnesota & Ontario	25½	27⅝
Oxford	33⅜—	34¼
Same Pref.	°88½-89	°90-91½
Rayonier	19⅜	22⅞
St. Regis	27	32
Same Pref.	°85-86	°88-91
Sealright	24½	27½
Scott	55¾	59½
Same $3.40 Pref.	°75-78	°75-78
Same $4 Pref.	°87-88—	°87-90
Union Bag-Camp	31¾	32⅝
United Board & Carton	22⅜	22½
United Wallpaper	7⅛	8⅝
Same Pref.	—	°17¼-18¼
U. S. Gypsum	60¾	59
Same Pref.	148	149
West Va. P. & P.	37¾	40
Same Pref.	°94½-96	°97⅜-100

New York Stock Exchange — Bonds

A.P.W. Products 5%	—	—
Champion P & F 3¾%	—	—
Champion P & F 3%	—	—
Mead 3%	—	—
Scott 3%	93¾	93

American Stock Exchange — Stocks

Allied Paper	9⅜	12⅜
American Writing	21	21
Brown	14⅜	17⅛
Puget Sound	15	15⅛

°Closing bid and asked prices.

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Only Jones is equipped to supply all types of stock preparation machinery . . . pulpers, beaters, disc and conical refiners, and screens.

So Jones is not limited to any one system. Whatever your stock preparation problem, you can count on your Jones representative for sound and unbiased recommendations, backed by Jones' reputation for quality and performance and more-than-a-century of paper mill know-how.

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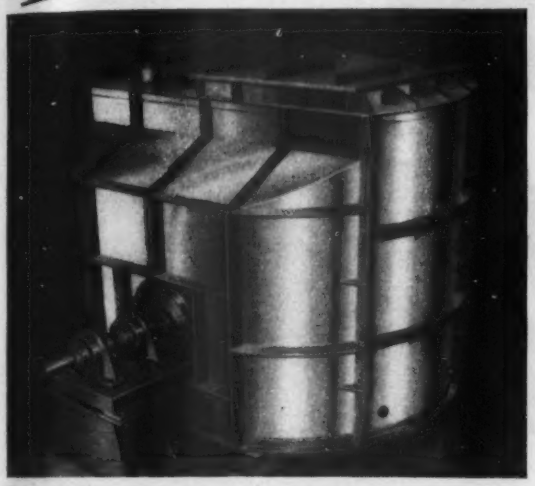
Jones HI-LO PULPER

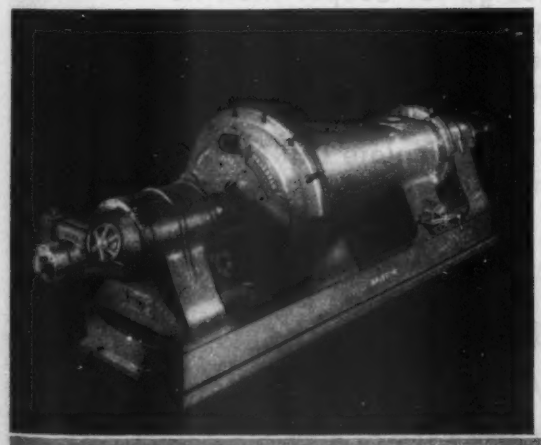


Engineered to eliminate the compromise imposed by conventional single-rotor pulpers between maximum circulation and complete defibering, the HI-LO employs two separately powered rotors to provide maximum pulping *and* complete defibering, with significant savings in time and power. For details, ask for Bulletin EDJ-1063.

Jones DOUBLE-D REFINER WITH EDJA-FLO

The only unit of its kind with *two stages of refining* in one machine, the Jones Double-D can actually do twice the work of conventional refiners because it has double the refining area — 2200 square inches in the 42″ model; produces stock of equal or better quality at a considerable saving in operating cost. Ask for Bulletin EDJ-1083.

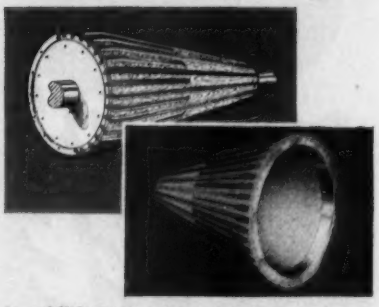
Jones MAJESTIC JORDAN



One of the most popular sizes in the Jones "family" of Jordans, the Majestic is second in size only to the Jones Leviathan. It offers efficient use of horsepower in quantity production, a wide range of tackle and a choice of handwheel, worm gear or Accru-Set® controls.

All Jones Jordans have split small heads and self-contained bearings for quick, easy dismantling and reassembly.

REVOLUTIONARY ADVANCE In Jordan Plug Design

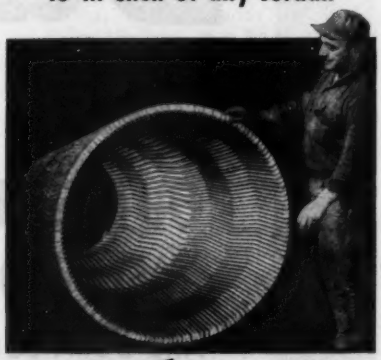


In addition to the strongest and most adaptable solid plug ever developed, Adapta-Plug is available in sleeve form for easy, economical conversion of old worn plugs.

Jones Adapta-Plug

Completely bandless, easily stripped and filled. Inverted-wedge-type slots hold bars firmly in place, eliminate hazards of slot wear and corrosion. Any desired edge available. Write for Bulletin EDJ-1094.

Complete ONE-PIECE assembly to fit shell of any Jordan



Jones FULBAR SHELL FILLINGS

Ideal filling for any Jordan, new or old, of any make. No keys or wedges needed. Easy to grind in. Many other advantages. Write for Bulletin EDJ-1094.

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NEWS of the INDUSTRY

NEW NEUTRAL sulfite pulp mill of Finch, Pruyn & Co. Inc. at Glens Falls, N. Y.

DURING OPEN HOUSE ceremonies a tour passes along the operating floor.

Multimillion-Dollar Hardwood Pulp Mill at Finch, Pruyn

HARDWOOD PULP production at a daily rate of between 70 and 100 tons was to begin in August at the new multimillion-dollar mill of Finch, Pruyn & Co. Inc. in Glens Falls, N. Y. The capacity will eventually be increased to 140-150 tons per day.

The pulp output will be utilized in the manufacture of high-strength, high-brightness printing and converting papers.

A diversification and expansion of Finch, Pruyn production is being made possible through new blends of hardwood and mechanical pulps. Neutral sulfite will lend strength, whiteness and stiffness, while a percentage of mechanical pulp will contribute to opacity, printability and economy.

A recently constructed wood room furnishes hardwood chips of birch, beech and maple to the neutral sulfite plant. The existing drum barker is now at work on the hardwoods. A reversible belt conveyor has been installed to serve both the existing groundwood mill and the new wood room.

Major wood room equipment consists of a hydraulically-operated splitter; an 84-in., 10-knife, 300-hp chipper; a three-deck vibrating screen, and a 34-in., 10-knife, 15-hp rechipper.

Chips are conveyed from the vibrating screen by means of a blower unit feeding a 10-in. chip delivery tube that extends from the wood room to the top of a 64-ft. silo 30 ft. in diameter. Silo capacity is 140 tons.

Magnets Remove Iron

Chips are transferred from the silo to the digester by a rotary table feeder, a series of three belt conveyors and a bucket elevator. One of the conveyors is equipped with a weightometer for determining digester charge and a system of magnets for tramp iron removal.

The 316 stainless steel-clad digester is 47 ft. high and 11½ ft. in diameter and has a 3500-cu. ft. capacity. It is equipped with a motor-operated chip charging valve and a chip packer. Forced circulation is

Principal Equipment Suppliers at New Finch, Pruyn Mill

Splitter ..... Carthage Machine Co.
Chipper ..... Carthage Machine Co.
Chip feeder and screen ..... Link-Belt Co.
Rechipper ..... Carthage Machine Co.
500-kva transformer ..... General Electric Co.
Chip silo ..... Stebbins Engineering & Mfg. Co.
Chipper motor and motor control center ..... General Electric Co.
Chip discharge feeder, bucket elevator and belt ..... Link-Belt Co.
Spent liquor storage tank ..... L. O. Koven & Bro. Inc.
No. 1 digester .... Graver Tank & Mfg. Co. Inc.
Heat exchanger ..... Struthers Wells Corp.
Blow tank ..... Graver Tank & Mfg. Co. Inc.
Instrumentation .... Taylor Instrument Companies
Rotary vane feeder and inclined rotary screen ..... Dorr-Oliver Inc.
Double-disc refiner ..... Bauer Bros. Co.
Double-disc refiner motors ..... Electric Machinery Mfg. Co.
Refined stock chest ..... Stebbins Engineering & Mfg. Co.
Rotary screen ..... Black-Clawson Co.
Inlet box and brown stock washers ..... Dorr-Oliver Inc.
Washer hood ..... Jamar-Olmen Co.
Instrument panel ..... Taylor Instrument Companies
Consistency regulator ..... DeZurik Corp.
Stock meter ..... Foxboro Co.
Chlorine mixer ..... Dorr-Oliver Inc.
Chlorinator tower .... L. O. Koven & Bro. Inc.
Chlorination washer, high-density mixer and caustic washer .... Dorr-Oliver Inc.
Centri-cleaners ..... Bauer Bros. Co.
Bleached stock storage ..... Stebbins Engineering & Mfg. Co.
Consistency regulators .... DeZurik Corp. and Trimbey Machines Inc.
Chlorinator ..... Fischer & Porter Co.
Agitation equipment ..... Dorr-Oliver Inc.
Pumps .. Ingersoll-Rand and Warren Pumps Inc.
Heating and ventilating controls ..... Minneapolis-Honeywell Regulator Co.

used to increase temperature and pressure by pumping cooking liquor from the center of the digester through a heat exchanger and return to both the top and bottom of the digester.

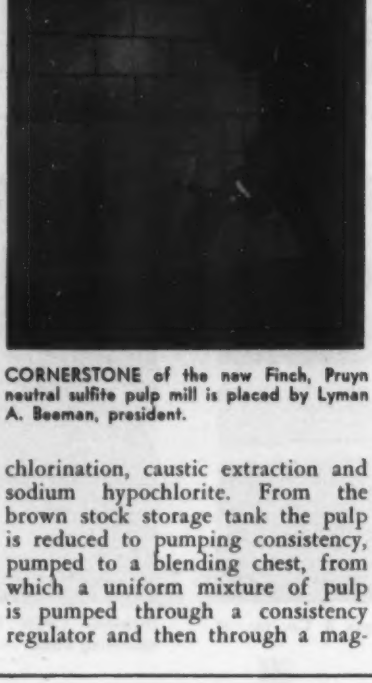
Also 316 stainless steel-clad is the blow tank, which is 53 ft. high and 22 ft. in diameter and holds approximately three digester blows.

Three-Stage Bleaching

A centrifugal chip pump transfers softened chips from the blow tank to rotary feeders that regulate the amount of chips to the Bauer double-disc refiners, each operated by two 400-hp electric motors.

Stock from the refiners drops to a chest feeding two Black-Clawson Selectifier screens discharging to the brown stock washing system. The latter consists of two Oliver vacuum washers 16 ft. long and 8 ft. in diameter operated with counter-current type washing. High-density brown stock is stored in a tile tank 36 ft. high by 16 ft. in diameter. The tank holds 25 tons of stock at 12-per cent consistency.

Three-stage bleaching is utilized: chlorination, caustic extraction and sodium hypochlorite. From the brown stock storage tank the pulp is reduced to pumping consistency, pumped to a blending chest, from which a uniform mixture of pulp is pumped through a consistency regulator and then through a magnetic flowmeter controlling the quality of pulp to the bleach plant.



CORNERSTONE of the new Finch, Pruyn neutral sulfite pulp mill is placed by Lyman A. Beeman, president.

The first addition of chlorine to the pulp then takes place, is mixed and pumped to a pre-chlorination tower (33 ft. high by 4½ ft. in diameter). Following this tower the second addition of chlorine is made and the pulp pumped to an upflow chlorination tower having an 8200-cu. ft. capacity, from whence it is transferred to the operating floor.

The pulp is then processed as follows: over the chlorine washer, caustic addition, through caustic tower, over caustic washer, hypochlorite addition, through hypo tower to centri-cleaners and over hypo washer. It is then conveyed by belt to the bleached stock storage tank of 16,000-cu. ft. capacity. From the storage tank the bleached pulp goes to a blending chest and is then pumped to the paper mill.

The hardwood used comes from 180,000 acres owned by Finch, Pruyn in the Adirondacks. Additional supplies are available from privately-owned lands within a 50-mile radius of Glens Falls.

Sales Up, Profits Down, APPA Survey Shows

Results of a recently completed survey conducted by the American Paper & Pulp Association show that in the first half of 1957 pulp and paper industry sales were up 8 per cent, while profits were down 11.6 per cent.

Sales of the 73 reporting firms amounted to $2,171,000,000 from January through June of 1957, as compared with $2,014,000,000 in the same period of 1956.

Profits after taxes were down to 7.8 per cent of net sales because of the higher costs of labor, transportation and materials. For the 1956 six-month period profits after taxes were 8.9 per cent of net sales.

According to Robert E. O'Connor, acting executive secretary of APPA: "It is expected that net profits for the whole year may be less than 1956. However, due to the anticipated higher rate of production for the balance of the year, the difference may not be as great as indicated by the 11.6-per cent first-half figure."

$5,000,000 Pulp Mill Proposed for Ontario

Porcupine Forest Industries Ltd., a recently organized Toronto firm, has announced plans to construct a $5,000,000 chemical pulp mill near Timmins, Ont.

Three Timmins companies are involved in the venture: Feldman Timber Co., Rudolph-McChesney Lumber Co. and A. E. Wicks Ltd. (an associate of Hill-Clark-Francis Ltd.).

Initial plans call for a daily production of 150 tons, with construction scheduled to begin in 1958.

Bestwall and J-M Announce Merger Plan

Bestwall Gypsum Co. may be merged into Johns-Manville Corp., according to a preliminary agreement reached recently. The two manufacturers of building materials would be united through an exchange of stock.

The report was issued by R. G. Lizars, board chairman of Certain-Teed Products Corp., and L. M. Cassidy, Johns-Manville chairman.

(Bestwall was organized in the spring of 1956 as a $20,000,000 firm to operate Certain-Teed gypsum and paper properties in the United States and Canada.)

J-M, headquartered in New York, N. Y., produces building materials, insulations and allied industrial products manufactured from asbestos, wood fibers, asphalt, etc. While Bestwall's output includes plaster, plaster lath, wallboard and a line of industrial gypsum products. It has gypsum deposits in Nova Scotia, produces newsprint and boxboard in Canada and operates a mill for the production of board and roofing felt in Pryor, Okla.

Westminster Buys Howard Smith Crabtree Div.

Having sought an eastern Canadian mill for some time, Westminster Paper Co. Ltd. has recently announced purchase of the Crabtree Div. of Howard Smith Paper Mills Ltd. at Crabtree Mills, Que. Westminster is located at New Westminster, B. C.

Involved in the transaction are a groundwood mill, a tissue machine and a fine paper machine. The tissue unit has been completely rebuilt since 1950 and has an annual capacity of about 7500 tons. The fine paper machine produces envelope, book, litho and other grades at a yearly rate of between 11,000 and 12,000 tons.

Westminster is partly owned by Scott Paper Co. of Chester, Pa.

Time Inc. Research Aims at Improved Paper

Long-range research aimed at the improvement of printing paper standards is to be undertaken by

Time Inc. (Time and Crown Zellerbach Corp. are constructing a $31,000,000 mill at St. Francisville, La., for the production of magazine papers.)

Experimental work in the recently announced program is to be completed at Time's Springdale, Conn. laboratories.

According to David W. Brumbaugh, vice president in charge of production, the principal objective is to achieve the knowledge necessary to produce a more uniform printing paper, along with the development of necessary equipment.

The results sought are a better printing quality, less downtime and less paper waste. To reach these goals new tolerance standards will be required throughout the manufacturing process.

Model Plant Constructed

The program will concentrate first on "forming" equipment. It will then move forward step-by-step through all the major production stages.

A plant for testing model paper machinery is under construction at Springdale. The 7378-sq. ft. building will contain a closed stock system that permits the pulping of both wet lap and dry lap pulps, stock proportioning, refining and screening. Provisions are being made for testing model "formers" and "wet presses". In addition, there will be a press for converting broke to usable nodular pulp.

St. Regis to Spend $6,000,000 for Machine Improvements

A major machine improvement program is well under way at three mills of St. Regis Paper Co. The project, which is being undertaken by the Printing Paper Div., involves plants at Deferiet, N. Y., Sartell, Minn., and Bucksport, Maine.

The over-all cost is expected to approximate $6,000,000.

A Bauer Bros. Co. centri-cleaner system will be installed at Deferiet, while a modified Bauer system will go in at Sartell. (At Deferiet the centri-cleaners, when coupled with the sulfite system installed last year, will give a 100-per cent pulp coverage.)

The No. 1 machine at Bucksport will also be equipped with Bauer centri-cleaner equipment.

At Deferiet a complete new broke system is scheduled for installation, while Nos. 2 and 5 paper machines are slated for a general renovation. Fourdrinier sections will be rebuilt. Major equipment for the No. 2 machine includes: a new drive and turbine, new suction press, suction box vacuum system, air system dryer felts, dryer felt guides, dryer doctors, a Sveen-Pedersen saveall and a sweat dryer and shake drive.

For the No. 5 machine: a new headbox and fourdrinier, felt drying system, fiber tooth dryer gears, a broke system, economizers, new

MILL EMPLOYEES AT Brown Co. gather at milk-vending machine—one of 32 located in the various plants of the large New England papermaker.

Brown Co. Solves Inplant Feeding Problem with Milk-Vending Units

SEVERAL YEARS ago inplant feeding posed an unusual problem for Brown Co. in Berlin, N. H. Not only were its many buildings located through some 4 miles of river valley, but the conditions and situation of each of five major mills and power plants were completely different.

It was determined that milk-vending units centrally located in the mills and plants might be the solution. However, bottle type units were declined because of the hazards of broken glass.

Venders were installed for soft drinks in paper cups. Candy and cigarette machines followed.

The representative of a Berlin dairy persisted in his efforts to have milk dispensers installed by Brown. The management declined once more. This time because it felt that the half-pint cartons did not offer a completely satisfactory answer to worker refreshment.

Cup-type Approved

Cup-type milk venders were being installed and operated by Automatic Canteen Co. of Portland, Maine. The venders themselves were being built by Food Engineering Corp. of Manchester, N. H. Brown officials ok'd a trial operation, and four "on-probation" venders were installed.

The experiment was a success, and a complete plant and mill survey was made to determine how many units would be required and the locations best suited for their installation.

It was decided that 32 venders would be needed. They have been located in locker rooms, time keepers' offices, stairways and other convenient spots determined most suitable by both management and the employees.

Other paper producers in the New England area that have found the Food Engineering machines suitable for inplant feeding include: S. D. Warren Co., the Hollingsworth & Whitney Div. of Scott Paper Co., Eastern Corp., Great Northern Paper Co. and St. Regis Paper Co.

(Food Engineering is located at 25 South Bedford St., P. O. Box 1026, Manchester, N. H.)

THESE TUBES (left) form the sides of the boiler's firebox, and it is inside them that the water is turned to steam. Here, worker checks bark feeder.

BOILER'S COIL SUSPENSION (above)—These huge springs are at the top of the boiler structure and allow the unit to expand or contract with heat variations.

Power Boiler Nears Completion at Savannah Mill of Union Bag-Camp

CONSTRUCTION WORKERS at the Savannah, Ga. mill of Union Bag-Camp Paper Corp. were at work in September putting the finishing touches on one of the paper industry's largest electric power-producers—the big No. 11 boiler.

Mid-October was the operational deadline. Already last month, the 12-story framework was nearing completion.

When in operation, the Combustion Engineering Inc. boiler will be capable of delivering 450,000 lb. steam per hour. The unit, the plant's biggest, is a bark-burner. The bark is the waste from the more than 3000 cords of wood that is consumed daily by the Georgia mill. Some 13 to 15 per cent of the plant's steam requirements comes from this source. (Natural gas or fuel oil will join with the bark in producing the power for the electric generators.)

Basically, the boiler consists of a tremendous box measuring 19 ft. × 24 ft. × 12 stories in height.

FRAMEWORK of 12-story plant for new No. 11 boiler at Union Bag-Camp.

Making up the walls of the "box" are vertical pipes—or "tubes." The gas will be fed into the boiler through 12 burners located on all four walls; the bark will be introduced by spreaders from some distance up the walls.

TV and the Inferno

The new No. 11 unit along with Union Bag-Camp's other boilers produce at a rated capacity of 80,000 kw—more than enough to serve a city the size of Savannah.

An industrial television camera is located in the boiler's arch roof and sighted into the inferno. A screen located on the main instrument panel enables the operator to look into the boiler's inferno from the top center. Thereby he can ascertain whether all 12 fuel burners are functioning properly.

A continuous ash discharge grate installed at the bottom of the boiler is in constant motion—like an endless belt. Accumulated ashes are carried out automatically and dumped into the ash-removal system.

Major equipment suppliers in addition to Combustion Engineering are: boiler feed pumps—Byron Jackson Pumps Inc.; turbines—General Electric Co.; fans—Westinghouse Electric Corp., Sturtevant Div.; ash system—United Conveyor Corp., and instrumentation—Republic Flow Meters Co.

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screens, dryer doctors, new dryers, a turbine and drive alterations, a suction second press and a rebuild of the wire pit.

Bleach Plant at Sartell

At Bucksport the No. 1 machine will be equipped with a new fourdrinier, pressurized headbox, new screening equipment and cleaning equipment, fan pump, broke saveall and auxiliary equipment and additions to the electrical control center and miscellaneous equipment.

Quality improvements at the Sartell mill include alterations to the pulp plant, a new bleach plant and a new kraft refining system. Also scheduled for installation are a 90,000-lb. steam generating unit and a second supercalender.

Certain increased productive capacity is planned for all three locations.

Power Expansion at Rhinelander

Substantial steam and electric power expansion is under way at Rhinelander (Wis.) Paper Co., a St. Regis subsidiary.

Expected to be completed in mid-1958 at a cost of approximately $4,000,000, the project includes the installation of a new boiler and turbo-generator.

The boiler is a Babcock & Wilcox Co. radiant type unit of the cyclone furnace variety and has a rated hourly capacity of 250,000 lb. steam and a peak load capacity of 260,000 lb. It will burn pulverized coal in extremely turbulent air and provide 90 per cent conversion of the available energy into steam. The boiler will operate at 1500 psi steam and a temperature of 950°F. It will be housed in a 10-story building now under construction.

The Westinghouse Electric Corp. turbo-generator is of the single-extraction back pressure type. The input steam pressure will be 1425 psi, extracting at 400 psi and exhausting at 125 psi. The generator will sup-

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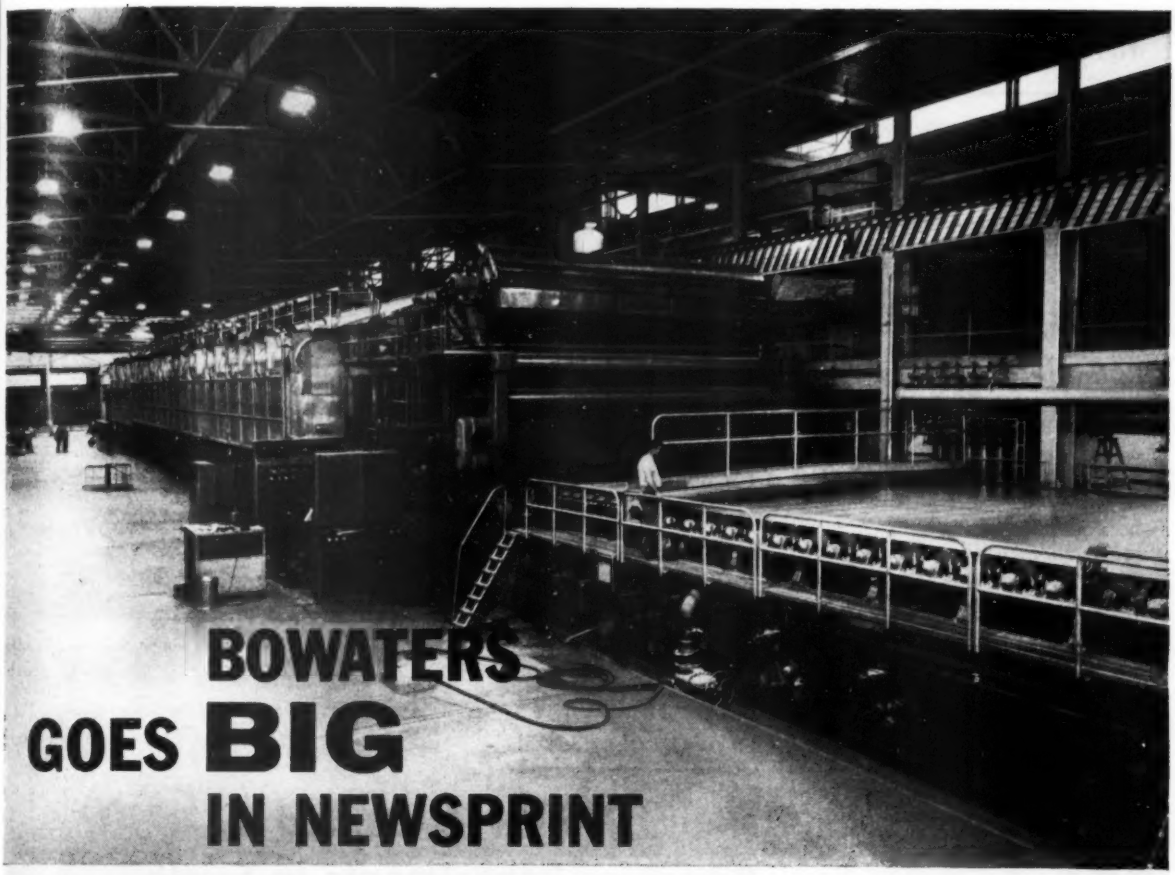

BOWATERS GOES BIG IN NEWSPRINT

with an installation by

F. H. McGRAW & COMPANY

engineers and constructors to American industry

Bowaters Southern Paper Corporation became one of the major newsprint producers in the United States in January of this year. That was when Bowaters' third machine, designed to produce newsprint at speeds up to 2500 feet every minute, went into operation at the Calhoun, Tenn., plant.

The complex new machinery, which raised plant production capacity to 300,000 tons a year, weighed close to seven and a half million pounds. It was installed, to tolerances as fine as one five-thousandth of an inch, by the skilled, experienced mechanical erection engineers and technicians of F. H. McGraw & Company.

The McGraw paper mill division has compiled an outstanding record of achievement in mill construction and precision installation for leading firms such as Container Corporation of America, Hartford City Paper Company, Kimberly-Clark, Coosa River Newsprint and others. In paper – as in other major American industries – McGraw men, methods, materials and machines are relied upon to solve tough problems of design, construction and installation, and to achieve on-time (or before-time) completion.

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ply approximately 9500 kw, which will feed directly into the existing 12,500-v distribution system.

A new water demineralizing plant capable of supplying 325 gpm will furnish the triple-distilled water required to operate at the high temperatures and pressure designed into the new boiler.

Flintkote-Cement Merger

Stockholders of Flintkote Co. have approved the acquisition of Kosmos Portland Cement Co. of Louisville, Ky. The merger—previously ok'd by Kosmos shareholders—became effective late in August through an exchange of stock. The Kentucky firm is being operated as a wholly owned Flintkote subsidiary.

Kosmos produces Portland and masonry cements for Kentucky and the southern parts of Illinois, Indiana and Ohio. Its plant is the only such operation in Kentucky and has a capacity in excess of 2,000,000 barrels per year.

Flintkote is a large user of Portland cement in the manufacture of its asbestos-cement products, Insulrock products and Van-Packer prefabricated chimneys.

Mando Plants 4,500,000 Seedlings in 21 Years

Minnesota & Ontario Paper Co. this spring planted its 4½ millionth tree seedling since the inception of its reforestation program, now in its 21st year.

Some 450,000 seedlings were set out on 420 acres of unproductive burned-over brushland during four weeks in May. This brought the 21-year acreage total to 3720. Among the valuable tree species used in the long-range project have been spruce, jack pine and Norway pine.

George B. Amidon, Mando's director of woodlands, reported that in addition to operations in Minnesota, experimental plantings were conducted in Ontario by the firm's Canadian subsidiary, Ontario-Minnesota Pulp & Paper Co. Ltd. A total of 95,000 seedlings were set out: 15,000 in the Fort Frances area and 80,000 in the Kenora region.

Mando also provides tree-planting equipment and trains tree farmers in its proper use. So far this year, about 70,000 seedlings have been planted on private lands as a direct result of this effort.

APPLICATION OF nitrogen fertilizer using farm equipment in a Rayonier pulpwood plantation (8-year-old slash pines) near Sanderson, Fla.

Forestry Notes

Heavy Timber Toll Cited by AFPI; Rayonier Experiments in South

INSECTS, DISEASE, fire, wind and other forest foes are killing 20 per cent of the wood volume added annually in the nation's forests.

Indirect losses—measurable only over a long period of years—are known to be far greater.

In a single year sawtimber killed by these timberland enemies amounts to 12,130,000,000 bd. ft. The direct destruction of forest growing stock (all trees 5 in. and more in diameter) reaches the staggering annual sum of 3,389,000,000 cu. ft.

Despite these losses—*and for the first time in the 20th century,* the United States is growing more wood than it is removing from the forests.

The best preventative for these losses, according to American Forest Products Industries, is good forestry. A vigorous growing forest usually suffers little injury from most insects and diseases, although even the most thrifty timberlands are subject to attack by such species as sawflies, tent caterpillars and other leaf-eaters. Access roads provide means for reaching with appropriate remedies areas affected by those diseases and insects against which mere vigor will not give protection.

New Fertilization Technique

A new technique of fertilizing pulpwood forests with standard agricultural equipment has been developed by Rayonier Inc.

The experiment, staged on a Rayonier tree farm in Florida, was undertaken primarily to test the response of southern pine to plant food.

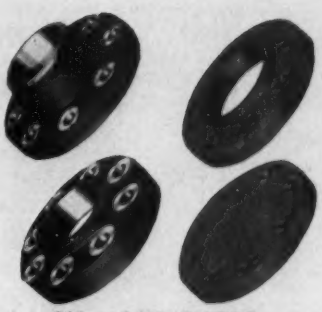
Said James T. Sheehy, Rayonier executive vice president: "A standard farm tractor pulled a spreader we borrowed from a local farmer who uses it for pasture fertilization".

The experimental area was divided into 84 plots. Eighteen various treatments were given 72 of the plots, and 12 were used as control plots. Fertilizers applied at varying rates and in several combinations were: urea, ammonium nitrate, ammonium nitrate-limestone, triple superphosfate and muriate of potash.

Detailed comparisons between trees in the control plots and those in the fertilized plots will be made in about five years and at intervals thereafter. Comparisons will also be made between size and health of the fertilized trees now and later.

(Continued on page 617)

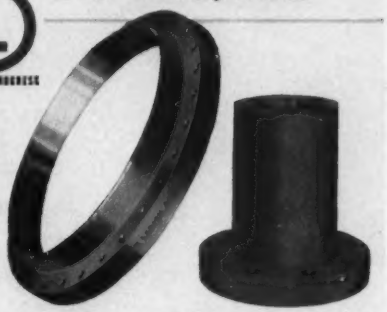
IPS—BUTT WELDING FITTINGS
½"-42" From Sch. 5S to 4" Walls



ASA and MSS FLANGES
½"-24" 150 through 2500 lbs.

TO MAKE PROGRESS

TUBE O.D.—BUTT WELDING FITTINGS
½"-36" From .049" to .250" Wall



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News of the Industry . . .

Rayonier hopes that the experiment will demonstrate the practicality of fertilizing nutrient-deficient soil in the South. It has been estimated that some 15,000,000 acres of forest lands in the area might well be made more productive through fertilization.

Borate "Bomb" Quells Fire

Calcium borate may be the new tool with which to fight and help control costly forest fires. The fine white powder—when mixed with water at the ratio of 4 lb. to the gallon—has in certain applications proved to be a valuable flame retardant.

It is especially suited to the "bombing" of forest fires from the air.

The technique—a United States development—was recently demonstrated to a large group of Canadian fire control authorities under the auspices of the Woodlands Section of the Canadian Pulp & Paper Association. The demonstration was staged near Dalhousie, N. B.

Playing a leading role in the development of the compound was United States Borax & Chemical Corp.

How and why sodium calcium borate helps to retard forest fires is still largely a mystery both to forestry experts and to research chemists of U. S. Borax & Chemical. This according to *The Financial Post*, Toronto.

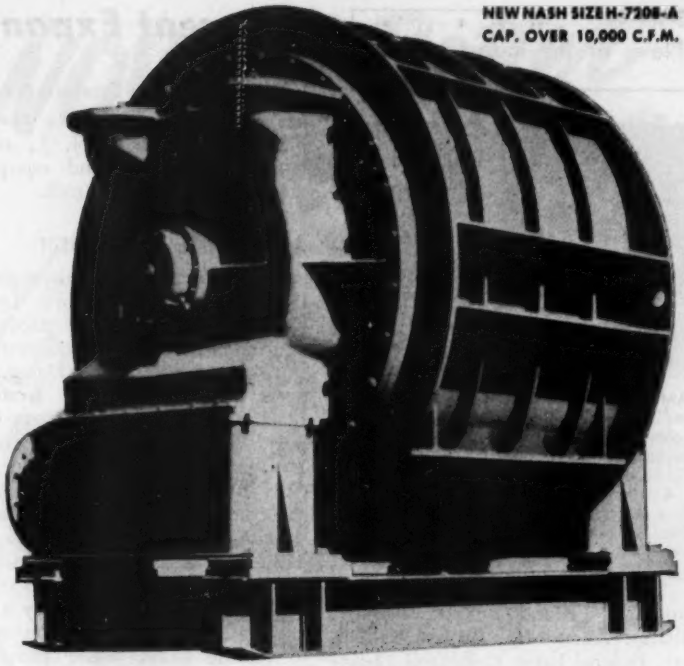
While the water-borate mixture does not, and is not primarily intended to, put out a fire, the borate deposited on the trees serves as an insulation even after the water in the solution has evaporated.

Thus one of the important uses that looms for the technique is the "holding" of fires by aerial bombing until ground crews can arrive at the scene of the blaze.

The only known deposits of sodium calcium borate in the world are located in Death Valley, Cal.

Allied News Notes . . .

Morningstar, Nicol Inc. has virtually completed negotiations for the acquisition of Federal Adhesives Corp. The action is subject to the approval of Morningstar directors and Federal stockholders. Operations of the latter firm will be coordinated with Paisley Products Inc., Morningstar's adhesive-producing



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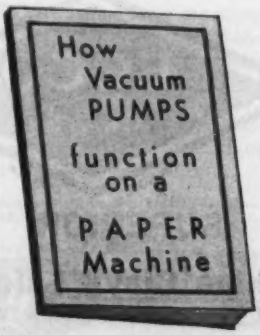

Of equal interest to Management and to Machine Operators is this informative booklet just published. A copy will be mailed to you free upon request.

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News of the Industry . . .

FRAME FOR A fourdrinier wire-weaving loom is moved with ease by workmen at Wisconsin Wire Works. The unit, weighing more than a ton, was placed on three Express Rollers for the 450-ft. trip. The rollers are distributed by Industrial East Co. of Clifton, N. J. (Wisconsin Wire was in the process of tearing down the machine and erecting it in a new plant location.)

subsidiary. Federal operates three affiliates: Adex Mfg. Co. of Baltimore, Federal Latex Corp. and Federal Chemicals Corp.

Allied Chemical & Dye Corp.'s Semet-Solvay Petrochemical Div. has announced a significant expansion of production facilities for emulsifiable A-C Polyethylene 629.

Black-Clawson Co.'s southern sales office has moved to new and larger quarters at 3166 Maple Dr. N. E., Atlanta 5, Ga.

Babcock & Wilcox Co.'s Tubular Products Div. has announced address changes for two district sales offices: in Syracuse at the Romax Bldg., 731 James St., Syracuse 3, and in Boston at 66 Central St., Wellesley 81, Mass.

Black-Clawson Co.'s Dilts Div. at Fulton, N. Y., has published a special anniversary insert appearing in the *Oswego Valley News*. The division is currently celebrating its 90th year in Fulton.

Recent Expansions in the Industry

Fibreboard Paper Products Corp. has discontinued its floor covering plant at Metuchen, N. J., and is moving machinery and equipment to its Emeryville, Cal. mill.

A New Polish Paper Mill has placed an order through the Parsons & Whittemore—Lyddon Organization for three paper machines and auxiliary equipment at a cost exceeding $6,000,000. The units will be supplied from the Black-Clawson Co. plant at Newport, England. They will include a 168-in. fourdrinier for producing a daily 100 tons of kraft paper; a 168-in. combination MG/MF machine producing 70 tons of wrapping daily, and a 168-in. MG unit that will turn out a daily 55 tons of MG papers. B-C will also supply a fully automatic stock preparation system to handle kraft, waste paper and straw pulps.

Albemarle Paper Mfg. Co. of Richmond, Va., has purchased substantially all the operating assets of Interstate Bag Co. of Walden, N. Y. The New York firm, long a consumer of Albemarle kraft paper, manufactures a wide line of paper shopping bags with patented paper handles. Interstate has become a wholly owned subsidiary corporation operating as an Albemarle division. The same officers and management remain.

Boise Cascade Corp. will, according to reports, construct a pulp and paper mill and container plant in Walla Walla County, Wash. The firm will form separate corporations as wholly owned subsidiaries and operate the pulp and paper mill as Columbia Kraft Corp. and the container plant as Columbia Container Corp. The mill will produce a daily 150 tons of kraft linerboard for corrugated boxes, plus some bag or wrapping paper.

South Dakota State College at Brookings has made a study that shows that paper production from straw in the Dakota area is a definite possibility, with output consisting of insulating and structural board, boxboard and corrugating paper.

Riverside Paper Corp. of Appleton, Wis., has been granted a permit to build a warehouse at a cost of $49,800. The structure will be so designed that production facilities may be installed in the future.

Appleton Coated Paper Co. of Appleton, Wis., is more than doubling its laboratory facilities for research and development. The 50-by 50-ft. addition to the present laboratory will cost more than $100,000.

Union Bag-Camp Paper Corp. recently placed an order for 24 Black-Clawson Co. jordans. The units represent a major step toward completion of the expansion program now underway at the Savannah, Ga. mill. The No. 5 jordans will be built at B-C's Shartle Div. plant in Middletown, Ohio. (The over-all Union Bag-Camp project includes the installation of a new paper machine that will add a daily 400 tons of kraft paper and board to production by late 1959.)

ENGLISH ECCO CLAYS TRADE MARK CLAYS

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Southland Paper Mills Inc.
was to begin a multimillion-dollar expansion early in September at its mill in Lufkin, Texas. On order is a newsprint machine that will add 90,000 tons to the plant's annual production. The project is the second major building program to be undertaken by the firm within three years.

Donohue Bros. Ltd.
will install a second-hand newsprint machine at its Clermont, Que. mill. The unit, to be known as No. 3, has an annual capacity of 30,000 tons and will increase the mill's production by about 40 per cent.

Continental Paper Products Co.
of Denver, a manufacturer of food containers, cartons, paper boxes, etc., will build a $650,000 office and manufacturing facility to replace the structure destroyed by fire a year ago.

Mead Corp.
of Dayton, Ohio, has acquired from R. J. Blum and associates all the remaining common stock of Mead Board Sales Inc. and Excello Paper Products Co., both of Cincinnati. Both firms become wholly owned Mead subsidiaries. Mead Board Sales is the sole distributor of Mead paperboard products; Excello manufactures a wide assortment of paperboard and liminated paper products.

Inland Container Corp.
will construct a corrugated box plant in Evansville, Ind. The 150,000-sq. ft. operation is expected to be in production sometime late this year.

St. Croix Paper Co.
at Woodland, Maine, is installing $130,000 in stainless steel fabrications in conjunction with its new high-speed newsprint machine. The fabrications include stock and white water feed lines and 4 miles of piping. The supplier was Portland Copper & Tank Works Inc.

Hygrade Containers Ltd.,
a subsidiary of Canadian International Paper Co., has put into operation its new $3,000,000 plant at Rexdale, Ont. Annual capacity of

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Patent Pending

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1½" 2" 2½" 3"

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COMPACT, SIMPLE—Malleable iron body; heat treated steel shaft; R.H. or L.H. thread. Eight sizes, ½" to 3".

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the 140,000-sq. ft. operation is 25,000 tons of board. Equipment includes one 96-in. Langston corrugator, five printer slotters, two die presses, five stitchers and three tapers.

Bauer's New Pressafiner

(Continued from page 599)

utility permits and designed for ease and safety in removal and replacement. Access doors of ample size are provided, and lightweight stainless covers enclose the extraction end of the machine.

Only the top half of the main cage needs to be removed for bar changes. The lower half is at workbench-height and normally is not removed from the base.

The entire top half of the gear box is removable. Oil flow to all bearings and gears is readily observed through flow gauges. Filter cartridges are easily changed.

Effort has been made to utilize the best materials for basic construction, and where abrasion is encountered the parts have been given protective overlays of stellite or other wear-resisting alloys. From feeder to outlet spout all contacted parts for pulp, expressed liquors or vapors are of stainless steel or corrosion- and wear-resisting alloys.

Commercial operation

The prototype No. 560 Pressafiner was installed at Otsego Falls Paper Mills, Otsego, Mich., in early March of this year. This mill was selected because the operating staff was aggressively research-minded, and their N.S.S.C. cooked chips were both abrasive and corrosive, providing an excellent test for the materials used in constructing the press. Furthermore, they have in this plant two earlier models of screw presses, which afforded an opportunity to make direct comparisons of performance on a day-to-day, or cook-to-cook, basis.

The daily production of pressed pulp from the No. 560 Pressafiner is in the range of 90 to 110 A.D. tons when the usual 56-57 per cent moisture N.S.S.C. chips are processed. Capacity of the machine can readily be varied from ¼ to full load of the 200-hp motor without affecting the normal steady discharge of pressed material.

Fiberizing is controllable within practical limits by adjustment of main shaft arrangement and through the use of special design "waveline" (patent applied for) screen bars. The shredding action being achieved on the new machine has exceeded that done by previously observed screw presses, and this feature appears especially desirable for the processing of 85 to 95 per cent yield pulps and full yield shredded furnishes for dry process hardboards.

Power requirements for the new machine are lower for equivalent amounts of extraction than was recorded for earlier types of screw presses. The average power input is 1.7-hp days per A.D. ton when pressing to 60 per cent total solids. At 50 per cent total solids pressing the power input drops to around 1.3-hp days per ton. A 200-hp polyvee drive is used on this experimental machine, and thus far transmission has been entirely satisfactory.

Experiments have been conducted to evaluate the hydraulic capacity of the machine, and, while we have no commercial experience on low consistency pulp pressing, the indications are that the very high ratios of drainage area, compared to conventional screw presses, are definitely beneficial in processing "wet" chips, screenings and pulp.

Conclusions

The foregoing brief presentation of operating data, based on more than five months of six 24-hour-days per week, reveals substantial proof that the dependability, capacity and

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This photo shows a section of a row of 15 glazed tile chests. Not only do they provide the cleanliness, free circulation and corrosive resistance of glazed tile but their walls furnish ample support for the mill floor. Note the pockets provided for the insertion of concrete floor beams.

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extraction objectives of our program were achieved.

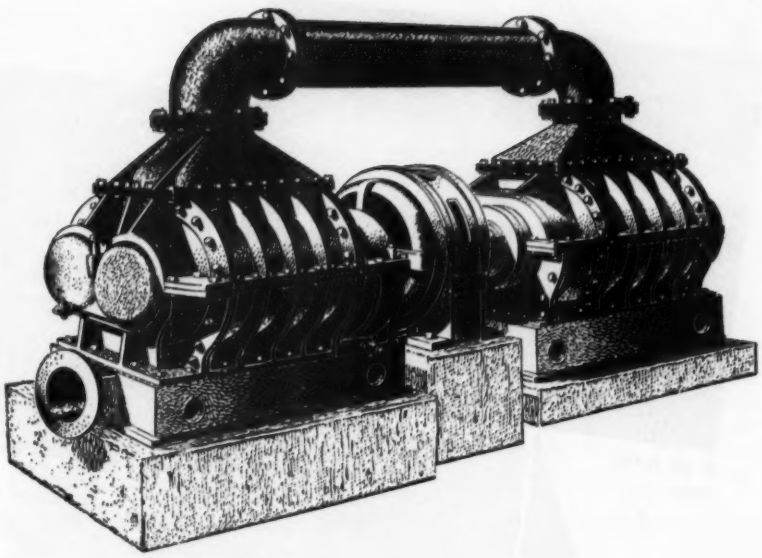
Secondly, three scheduled dismantlings of the machine were made to check parts for wear, corrosion and distortion. Examination indicates that their life will be commercially satisfactory.

It was observed that the closer we approximated the laboratory displacement-pressure curve for given materials, the more efficient the Pressafiner performance became. This limited experience checks laboratory forecasts that for fluid extraction pressure should be applied as gradually as is feasible in reaching the desired moisture level. Comparison of laboratory batch pressing test data and commerical results indicates that the laboratory set-up will be useful to obtain preliminary information for planning test runs on the No. 560 Pressafiner in our laboratory. However, there appears to be no correlation between extraction pressures and the extent of fiberizing. Fiberizing can be controlled somewhat independently by main shaft assembly and screen bar design.

Comments made by the operating and maintenance groups servicing the first No. 560 Pressafiner confirm that the major mechanical design goals have also been reached. The equipment can be dismantled with power tools in far less time than was required for earlier designed screw presses, and the mechanics report that the design of parts permits easy handling in a completely safe manner.

The sealing of expressed liquors from entering the gear case has been effectively accomplished, and the use of filtered forced oil to gears and bearings has had the endorsement of the service group. A quick inspection of the bank of eight oil flow gauges indicates lubricating condition at all times, and an audio low oil-pressure signal provides adequate safety should the lubricating system pressure fall below established minimum.

The successful development of the No. 560 Pressafiner in a relatively short time was a result of integrated team work, and the authors of this paper gratefully acknowledge the excellent cooperation of John L. Ostborg & Associates, Otsego Falls Paper Mills, Green Bay Paper & Pulp Co. Ohio Steel Foundry Co., United Welding Co., Bornell Supply Co., Recknagel Machine Products Co. and the equipment suppliers who participated in this project.



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R-C vacuum pumps are supplied in single-stage or compound units to meet any capacity requirement. For specification data, write for Bulletin 50-B-13.

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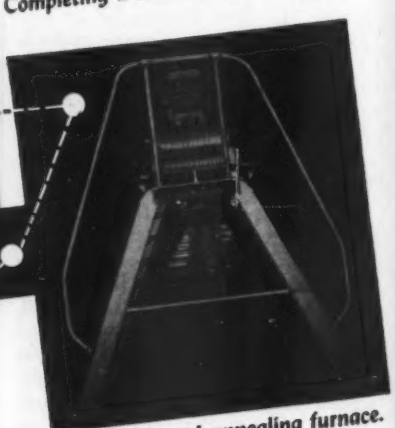

A Lindsay designed annealing furnace.

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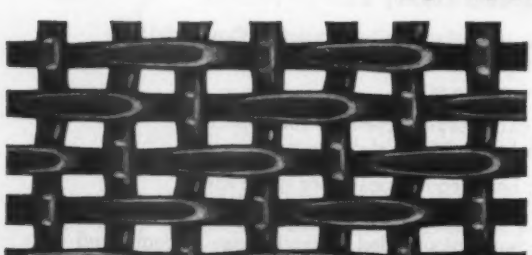

Since 1903, Lindsay has specialized in one field—the weaving of Fourdriner wires to make possible better paper and paper products. To that end, we design, engineer and build much of our own equipment, especially our looms. Result—a closer, surer control over the quality of Fourdriner wire cloth.

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FOR PAPER MANUFACTURING

NAMES *in the* NEWS

Institute Elects Trustees

W. R. Adams, president of St. Regis Paper Co., and P. H. Glatfelter III, president of P. H. Glatfelter Co., have been elected members of the board of trustees of the Institute of Paper Chemistry, Appleton, Wis.

They will serve five-year terms and succeed Stuart E. Kay, vice president of International Paper Co., and Herbert T. Randall, vice president of Champion Paper & Fibre Co. Kay and Randall have served as trustees for many years but were not eligible to succeed themselves under the present by-laws of the Institute.

Marathon Appointments

Marathon Corp. announced in Wausau, Wis., recently the appointment of four men to executive positions.

Emmett W. Below of Menasha, controller since 1951, was named vice president for finance. James P. Buchanan of Neenah, assistant treasurer since 1954, was named treasurer. He was treasurer and a director of Northern Paper Mills when that firm was acquired by Marathon in 1953.

Alden H. Christianson of Neenah, assistant controller since 1954, was appointed controller. And William J. Steinmetz, formerly a tax manager for Arthur Andersen & Co., was elected assistant treasurer.

Cook Elected Vice President of K-C

W. F. Cook has been elected vice president of Kimberly-Clark Corp. of Canada Ltd. He is to headquarter in Toronto and will be responsible for coordinating industrial relations policies and programs for all Canadian operations.

Associated with the K-C organization for 29 years, Cook has an extensive background in personnel administration. Between 1944 and 1948 he served in a dual capacity as mill manager for Kimberly-Clark of Canada and personnel manager for Spruce Falls Power & Paper Co. Ltd. Returning to the United States in 1949, he was named director of K-C's industrial relations department in 1951 and prior to his recent appointment served as assistant to the executive vice president, specializing in management development.

Shattuck Retires After 60 Years at Strathmore

A. E. Shattuck has retired from Strathmore Paper Co. in West Springfield, Mass., after 60 years of continuous service. He is 82.

A director since 1911, Shattuck joined Mittineague Paper Co. in 1897 as a bookkeeper. (Mittineague was the predecessor firm to the Strathmore organization of today.)

In 1901 he became mill superintendent and in 1917 manager of the Supply & Standards Div. He served as assistant treasurer from 1919 to 1947 and in 1942 was elected vice president in charge of supply.

Champion Promotions

Champion Paper & Fibre Co. has announced the promotion of Herbert W. Suter to the new position of senior vice president in charge of marketing. He was formerly vice president for sales.

H. W. Suter

H. W. Suter Jr.

Henry Rigby

Karl Bendetsen

At the same time, Reuben B. Robertson Jr., president, reported the organization of a new division to be known as the Champion Paper Sales Div. H. W. Suter Jr., former sales manager, becomes a vice president and division manager.

Other appointments in the Champion organization are as follows: Henry W. Rigby, former vice president for operations, becomes vice president in charge of corporate development. Karl R. Bendetsen, now vice president and manager of the Texas Div., succeeds Rigby as vice president in charge of operations. Stephen B. Chase Jr. has been named vice president and manager of the Texas Div.

J. Larcom Ober of Beverly, Mass., a retired vice president of Scott Paper Co., has been reelected president of the University of Maine Pulp & Paper Foundation.

William Kennedy, formerly a sales engineer with the Paper Machine Div. of Black-Clawson Co., has joined the manufacturing department of Nekoosa-Edwards Paper Co. of Port Edwards, Wis. He will be assigned responsibilities in the installation of a new paper machine at the Nekoosa mill, as well as overall paper machine operations.

James W. Taylor, since 1953 manager of the Milwaukee district office of Bailey Meter Co., has joined the engineering department of Consolidated Water Power & Paper Co. at Wisconsin Rapids. He will serve as a meter and instrumentation engineer.

Robert B. Pamplin has been elected president of Georgia-Pacific Corp., whose wholly owned subsidiary—Georgia-Pacific Paper Co.—is constructing a kraft pulp and paper mill at Toledo, Ore. Formerly executive vice president, he succeeds **Owen R. Cheatham,** the company's founder, who will continue as chairman and chief executive officer. Pamplin will headquarter in Port-

(Continued on page 646)

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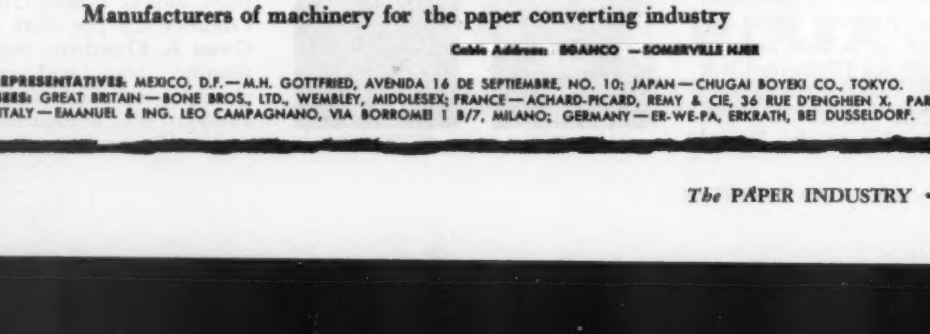

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FOREIGN ABSTRACTS

Effect of plant cancer on beechwood components

Fig. 1 shows beechwood that has been attacked by cancer. The "normal" wood extends from 1 through 2 to 9. The cancerous growth begins at 3, and sections 3, 4 and 5 appear to show the greatest change in components.

Special emphasis is placed on cellulose (determined by Kürschner's method) and lignin (determined by the procedure of Komarov and König). The cancer causes a great increase of lignin at the expense of the cellulose, although the sum of lignin plus cellulose remains almost constant throughout (about 68.2 to 70.2 per cent).

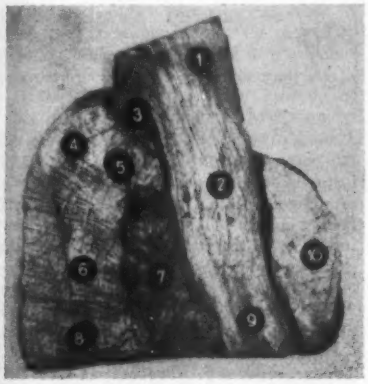

Fig. 1

As an example, section nine (cf Figure) contained 30.33 per cent cellulose and 19.77 per cent lignin in this "normal" part of the wood. Section three, which was infected with cancer, contained 37.77 per cent cellulose and 31.29 per cent lignin. It will be noted however that the sum of cellulose and lignin in these areas was nearly the same.

Four cuts and 1 table are included. C. Simionescu and M. Grigoras (Jassy, Roumania) *Paper and Timber* (Finland) 39, 283-4 (1957) (in German).

Printing papers under varying atmospheric moisture conditions

A series of graphs shows the relationship between temperatures (between minus 20°C and plus 30°) and the water vapor content of a cubic meter of air; and the dependence of the moisture content of two art printing papers on the relative humidity at 20°C.

The importance of the relative humidities at a specific temperature in the conditioning of printing papers was shown experimentally. Relative humidities that are too high and that cause condensation to take place also cause wrinkling of the sheet, thus affecting its surface and printability. Relative humidities that are too low may cause a shortening of the paper edges with the result that the sheets do not lie flat. These effects are shown in the accompanying cuts. Fig. 2 shows a sheet of art paper lying flat at 20°C and 65 per cent relative humidity (on the left) and the same paper at 20° and 95 per cent relative humidity (on the right). Fig. 3 shows an "imitation" art paper at 20° and 65 per cent relative humidity and also (on the right) at 40 per cent relative humidity. The importance of suitable conditioning under adequate storage conditions is emphasized.

Erwin Lemke. *Allgem. Papier-Rundschau* 1957, 514-16, and 569 (in German).

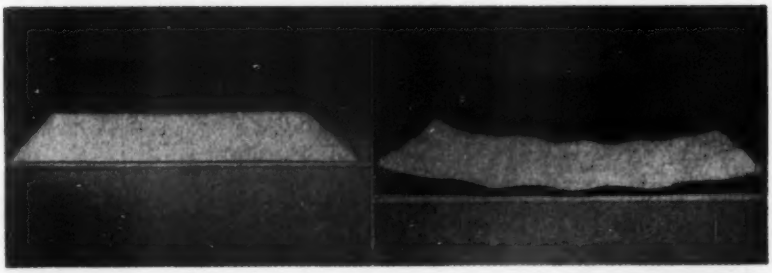

Fig. 2

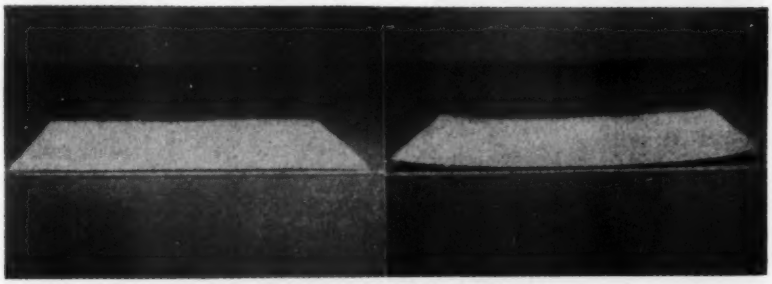

Fig. 3

Fungi in pulp and paper mill effluents

The microorganism found most frequently in mill effluents is the filamentary bacterium *Sphaerotilus natans* and its many variants.

This organism is made up of longitudinal cells held together by a hemicellulosic membrane which contains glucose, galactose, arabinose, xylose and ribose units. Protein in the organism contains 18 different amino acid residues. The bacterium mulitplies by cell division, but much more slowly than do the yeasts. The optimum growth temp. range is 7-17°C. The extreme limits are from 5 to 40°C. The optimum pH range is 6-8, with little growth much above or below this region.

The organism is aerobic and cannot reproduce when the oxygen drops below 3 mg. per liter; the water salinity may not exceed 0.2 per cent. The nutrients required by the bacterium include: potassium, manganesium, calcium, phosphates, sulfates, chlorides and a source of organic nitrogen. The organism can utilize certain alcohols, which are preferentially glycerol, butanol, mannitol and sorbitol. The bacterium degrades hexoses more rapidly than pentoses or disaccharides. With few exceptions, organic acids are utilized quite rapidly. Very small amounts of organic nutrients may be sufficient to permit the development of the organism.

In one instance, the bacterium was found to grow when the spent liquor from a beechwood pulping operation was diluted one million times—so that the sugar content was only 20-50 micrograms per liter. A Bavarian chemical plant which suffered from rich growths of the organism in its cooling water ducts traced this difficulty to the leakage of very small amounts of butanol, acetic acid and nitrogenous materials into the cooling water. When the

water was chlorinated, results were only partially successful, since active chlorine residues had to be kept below 1 mg. per liter.

A brook which received the effluent from a German pulp mill was covered with the red fungi, caused in the main by *Fusarium, Mucor* and related species. The growth of the organism *Sphaerotilus dichotoma* was greater when the downstream area showed an increase in pH to 6.4 (due to leached limestone or to the occasional seepage of lime sludge from the mill).

Some data are given on the amount of fungal material growing per ton of spent liquor. W. Höhnl *Wochbl. Papierfabrik* 84, No 14,564-5 (1956) (in German).

Pitch troubles in sulfite pulp; effects of barking and storage

The influence of different ways of barking spruce wood and of the effects of storage in water and on land on the amounts of pitch deposited on a metal surface was studied.

The spruce wood used was clean-barked, half-clean barked, strip-barked or not barked at all, prior to storage. In general, considerably more pitch was deposited on copper [as described previously, cf. *Paper and Timber* (Finland) 34, 121 (1952)] from pulp made from water-stored wood than that made from wood stored for a corresponding time period on land. From the point of view of pitch troubles, the barking of wood is not very significant.

The experiments gave no unequivocal answer to the question as to time that wood must first be stored on land to prevent the resulting pulps from causing pitch troubles after a subsequent seven-month storage in water. However, after six months storage on land, pulp-pitch deposits were not increased in the case of wood subsequently stored seven months in water. If, however, the logs are first immersed in water for seven months and then kept in storage on land for varying time periods, a year of land storage was required before the amount of pitch from the resulting pulp was of the same magnitude as that from wood stored on land for a year.

Ether extracts of the pulps made from woods stored under various conditions were also determined. Water-stored wood gave pulps with higher ether extractives than did land-stored woods.

Three references and three tables are given. C. Gustafsson, S. Kahila, and T. Lindh. *Paper and Timber* (Finland) 39, 277-82 (1957) (in English).

British Guiana rice straw for papermaking

Rice straw was cooked by the kraft process in an externally heated rotating steel digester under various conditions of alkalinity and sulfidity. The liquor to (oven dry) straw ratio was 6:1. The digestion required 1 hr. to reach the maximum temperature of 150° C and was maintained at this temperature for 1 hr. Test sheets were made and evaluated. Bleaching trials were made using the usual Three-stage bleach and, in other cases, a single-stage chlorine bleaching operation. Beating studies with both bleached and unbleached pulps were made in a Valley Niagara beater. When the pulp produced had been made with 10 per cent effective alkali and 20 per cent sulfidity, and then bleached with a single stage operation, its properties were similar to those of a commercial bleached wheat straw pulp, and paper made from this pulp could be used for printing, writing and light wrappings.

The other pulps made in this series were inferior in their physical properties. Their strength was lower, and they manifested high drainage time and a low Canadian Standard Freeness. These inferior pulps then required the admixture of long-fibered pulp in order to yield a suitable papermaking furnish. However, rice straw should be worthy of further consideration as a papermaking material.

Nine tables, six graphs and two references are included. A. E. Chittenden and D. Morton. *Colonial Plant and Animal Products* (Gt Britain) 6, No. 1, 53-62 (1956) (through *Bull.*) *Inst. Paper Chem.* 27, No. 11, 1289 (1957).

New approach to grinding fundamentals

A method was devised that made it possible to sample the pulp-water film at various points between the stone and the log under actual grinding conditions. The ingenious experimental procedures are described in detail, using a two-pocket grinder (with only one pocket in use) operating at peripheral speeds ranging from 13 to 25 meters per sec., grinding pressures of 1-5 kg per sq. cm. and pit temperatures ranging from 20-70° C. The wood used was either water-logged "bankiray" or spruce. Small holes were drilled in the experimental logs, leading from which were copper tubes that were attached to a suitable pressure-reading device. Thus graphs could be drawn showing the hydraulic pressures developed over varying grinding distances and at varying grinding temperatures and speeds. The effects of pit temperatures for a specific grinding temperature and speed were also shown graphically.

It was indicated experimentally that the water film between the stock and the log exerts a pressure which itself tends to relieve a portion of the pressure with which the log is pressed against the stone (i.e. the grinding pressure). This hydraulic pressure varies over the length of the grinding surface and increases rapidly with increased peripheral speed of the stone and with increased grinding pressure and temperature.

Under commercial operating conditions with modern high-speed grinders, this hydraulic pressure is a significant part of the applied grinding pressure. The grinding process is explained as follows: the pressure in the water film between log and grindstone tends to separate the wood from the stone, so that only the protruding portions of the latter are in touch with the log. These points of contact furnish one of the reasons why fibers are detached from the wood. Another reason for the grinding action is to be found in the high shear rates existing in the liquid film. This shear

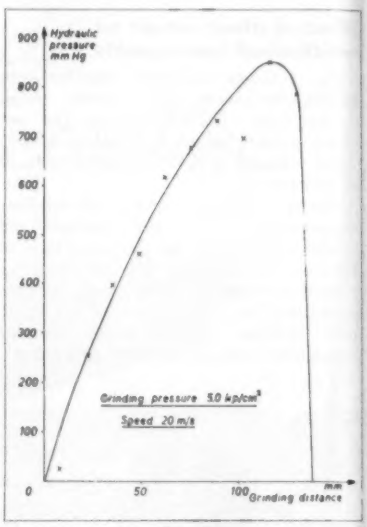

Fig. 4

is probably largely responsible for the regrinding of initially removed fibers and fiber bundles. The peak hydraulic pressures (850 mm Hg) is shown in the graph of Fig. 4. The maximum average hydraulic pressure was shown to be about 20 per cent of the grinding pressure applied to the log. Eight figures are given.

B. Steenberg, Jan Eckermann, and Bertil Johansson. *Norsk Skogind,* 11, 235-239 (1957) (In English).

Pilot plant studies on chemigroundwood

The work emanates from the Svetogorsk mill, U.S.S.R. Chemigroundwood was prepared from spruce, pine, birch and aspen. Blocks about 75 centimeters in length were impregnated in a digester of 1.5-cubic meter capacity and evacuated for about 45 min. Subsequently, a liquor containing 100-120 grams per liter of sodium sulfite (pH 12) was introduced. The system was then brought to 150-155°C and 5 to 5.5 atm. pressure over a 1.5-hr. period. The maximum temperature was maintained for 8 hrs. in the case of spruce and pine and 6 hrs. for aspen and birch.

The liquor was withdrawn and stored and on being refortified could be reused. Sulfite consumption was about 10-12 per cent, based on the weight of dry wood. The treated wood was then ground in a four-pocket grinder, thus furnishing the chemigroundwood. In a series of control experiments, untreated and presteamed wooden blocks from the same species were

also ground under similar conditions, giving respectively the conventional white and brown groundwoods. The resulting pulps were all evaluated, and the breaking lengths, double folds, burst and tear resistances were determined for each of the species and also for the pulps prepared at various grinding temperatures and grinding loads. Power consumptions in grinding were also compared for the chemigroundwood and the white groundwood pulps. These favored the chemigroundwood since its production (in the case of the conifers) entailed 10-15 per cent less power and, in the case of the hardwoods, 50 per cent less power than did the corresponding white groundwoods. Unlike the conventional white and brown groundwoods, chemigroundwood pulps increased in strength with decreased freeness on beating.

Various data are given on the moisture contents of the logs prior to and after impregnation, and on the concentration of chemical in the liquor before and after impregnating the wood. The more detailed grinder studies were made with chemigroundwood from spruce and aspen. Experiments were also made by impregnating pine, aspen and birch with kraft liquor (10-12 gram per liter) in place of the sulfite. Under these conditions, the hardwoods gave pulps that were superior in strength to those obtained by the customary grinding process, but inferior to the chemigroundwood pulps from wood impregnated with sodium sulfite.

K. N. Malyshkin and V. S. Korotkov. *Bumazh. Prom.* **32**, No 3, 13-17 (1957) through *C.A.* **51**, 11713 (1957) (Original in Russian).

Swelling studies in wood

The woods studied were: the "umbrella tree" (*Musanga smithii*, R. Brown), birch (*Betula verrucosa* Ehrh.), beech (*Fagus silvatica*, L.), poplar (*Populus nigra*) and pine (*Pinus sylvestris*). The swelling agents used were water and methyl, ethyl, propyl, butyl and amyl alcohols. Densities of the timbers ranged from 0.15 to 0.7 gram/cubic centimeter. The highest swelling was noted in the case of water and

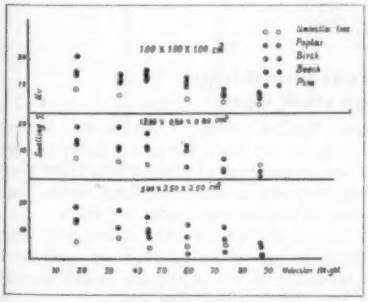

Fig. 5

was proportional to the oven-dry density of the wood, excepting for the very light species, in which case the swelling was higher than would have been expected from the density.

From the density-swelling relationship, the fiber saturation coefficient for the different timbers in the various liquids was calculated. These same coefficients were also estimated by taking into account the highest liquid content and the oven-dry density of the specific wood studied. The values estimated were inversely proportional to the density. On the oven-dry basis, a hyperbolic relationship was established. The swelling of the wood was inversely proportional to the molecular weight of the swelling liquid (as shown in Fig. 5), and the dimensions of the test pieces had a significant bearing on the swelling (also shown in Fig. 5); however, some of these results were irregular.

Five tables, five figures and 22 references are included. V. B. Kumar. *Norsk Skogind.* **11**, No. 7, 259-268 (1957) (In English).

Factors in designing a pulp and paper mill using bamboo

The author discusses material handling, some of the disadvantages of instrumentation in India, a rational plant layout (which is illustrated by a simple figure), process selection and size of plant (in terms of capital investment and capital charges per ton of pulp in mills with different production capacities). The advantage of erecting mills with high production and of integrated pulp and paper mills are emphasized.

P. B. Chaudhuri. *Indian Pulp & Paper* **11**, 495-502; 509 (1957).

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PATENT REVIEWS

MELVIN NORD*

Treatment of sodium base sulfite residual liquor

U.S. 2,792,350, issued May 14, 1957, to Linn Bradley and Robert Q. Boyer, assigned to Western Precipitation Corp., describes a method of treating sodium base sulfite residual liquor to recover the sulfur and sodium content and regenerate the sulfite compound of sodium for re-use.

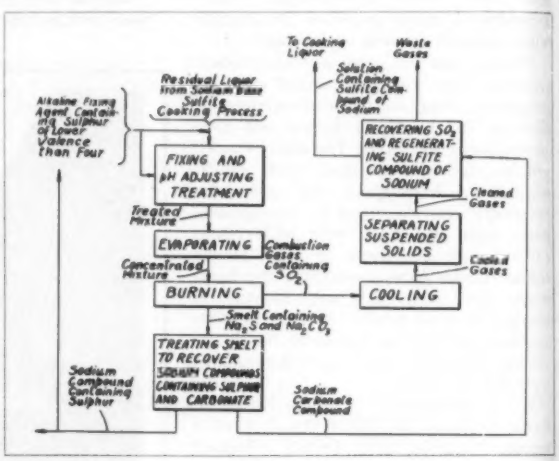
To Cooking Liquor
Waste Gases
Solution Containing Sulfite Compound of Sodium
Residual Liquor from Sodium Base Sulfite Cooking Process
Alkaline Fixing Agent Containing Sulphur of Lower Valence than Four
FIXING AND pH ADJUSTING TREATMENT
RECOVERING SO_2 AND REGENERATING SULFITE COMPOUND OF SODIUM
Cleaned Gases
Treated Mixture
EVAPORATING
Combustion Gases Containing SO_2
SEPARATING SUSPENDED SOLIDS
Concentrated Mixture
Cooled Gases
BURNING
COOLING
Smelt Containing Na_2S and Na_2CO_3
TREATING SMELT TO RECOVER SODIUM COMPOUNDS CONTAINING SULFUR AND CARBONATE
Sodium Compound Containing Sulphur
Sodium Carbonate Compound

Fig. 1

Fig. 1 is a schematic flowsheet of the process. The heart of the process is the "fixing and pH adjustment" treatment. Here, the object is: to lower the sulfite ion concentration; provide a treated mixture substantially free from volatile sulfur compounds; suitably adjust and stabilize the pH of the mixture and produce a favorable ratio of sulfur to sodium in the concentrated mixture obtained by evaporation of water, in order to reduce the corrosive nature of the mixture; prevent the release of sulfur dioxide or other volatile sulfur compounds during evaporation; provide a treated mixture which can be concentrated to a high degree without precipitation; provide a concentrated mixture which is easily flammable in a burning operation in a modern kraft recovery unit, and to promote the release of sulfur as sulfur dioxide in the burning operation.

Production of fibrous board from matted long cotton stalk fiber

U.S. 2,794,738, issued June 4, 1957, to Arthur M. Spencer and Abner Jacobson, assigned to Fibre Corp. of America Inc., describes a method for the preparation of fibrous board and sheet for insulation and other purposes from matted long cotton stalk fiber without the addition of extraneous binder substance.

Cotton stalk fiber is unique in that the fiber is not only long, resilient and flexible, but in its natural state such fibers are bonded together by a resinous substance of low acid value which may be readily separated by a low, dilute alkali digestion.

The fiber of cotton stalk is separated by digesting conveniently short lengths of chopped cotton stalk in a dilute aqueous solution at a relatively low temperature for a short period of time. The weak acid resins bonding the fiber are solubilized in this treatment and the alkali totally absorbed by reaction with the natural resin, whereby a substantially neutral fiber bundle is obtained

*Patent attorney, 17600 Pinehurst, Detroit 21.

which is easily separated into single, strong and flexible fibers of normal and unbroken long lengths by a mild beating. Thereafter, the fiber, without separating from suspension in the digestion bath, is deposited on a screen and subjected to heat and pressure to convert it to a dry strong but porous fiberboard or paper, depending upon the thickness of the deposit on the screen. The product is adopted for use as insulating board or insulating paper and is particularly adaptable for the manufacture of felt or analogous uses without addition of extraneous chemical binding substance.

Control of boron poisoning in plants

U.S. 2,794,299, issued June 4, 1957, to Seymour Thomas Jr. and assigned to Crown Zellerbach Corp., discloses a method of combating boron poisoning in plants by the use of ammonium-base sulfite waste liquor. Dried solids from the spent liquor may for example be added to irrigation water to accomplish the desired result.

Pulp screening apparatus

U.S. 2,796,809, issued June 25, 1957, to William J. Sprau, and assigned to National Gypsum Co., describes a pulp screening apparatus, in which clogging of the interstices is avoided by periodically reversing the flow through the screen without returning properly screened fibers to the unfiltered side of the screen.

Briefly, this is accomplished by providing a source of fresh or white water adjacent to the filtered side of the screen at the proper time and place, so that relatively fiber-free liquid passes back through the screen.

Apparatus for corrugating paper or cardboard

U.S. 2,793,676, issued May 28, 1957, to Max Hubmeier, assigned to Aktiengesellschaft der Maschinenfabrik von Theodore Bell & Cie., provides an apparatus for producing longitudinally corrugated paper or cardboard and crosswise corrugated cardboard or double-double board in continuous process and at high speeds of operation.

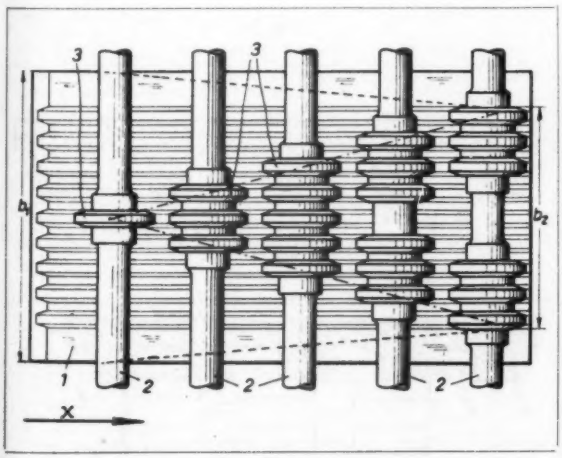

Fig. 2

In Fig. 2, the numeral 1 indicates a stationary heated plate provided with parallel grooves, the profile of which corresponds to that of the longitudinal corrugations it is desired to obtain in a run of paper or cardboard. A number of pressing devices cooperating with the plate 1 are arranged above the latter, each consisting of a shaft 2 on which grooving rollers 3 are mounted. The run of paper or cardboard to be corrugated is introduced from the left and proceeds between the plate 1 and the rollers 3 in the direction indicated by the arrow X. A first corrugation in the paper or cardboard is produced by the roller on the first shaft from the left along the center line of the paper run; the

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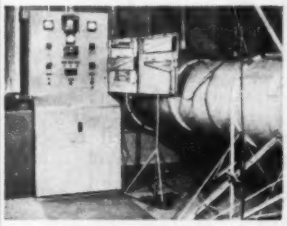

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Patent Reviews . . .

rollers on the second shaft produce a further corrugation on each side of the first one, those on the third produce two further corrugations 1 and so on. The initial breadth b_1 of the paper run in this process diminishes to the final effective breadth b_2 of the corrugated run.

The paper or cardboard is guided in the stationary plate 1 during the whole corrugating operation from the moment it is seized by the first roller to that at which it leaves the last rollers. The plate 1 may be extended to the right to a device (not shown) in which the corrugated paper or cardboard is bonded to a flat covering layer of paper or cardboard or directly to a layer of transversely corrugated paper or cardboard.

Suction press roll

U.S. 2,793,571, issued May 28, 1957, to Thomas H. Way and Donald G. McLeod, assigned to United States Rubber Co., describes an improvement in the manufacture of suction press rolls, whereby far better bonding between the rubber cover and the cylindrical bronze shell is obtained.

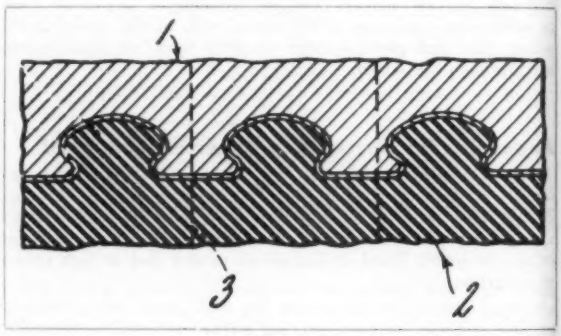

Fig. 3

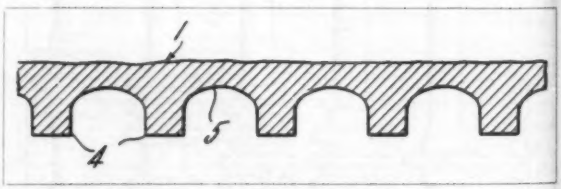

Fig. 4

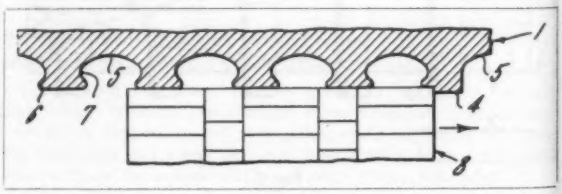

Fig. 5

The invention is based on the discovery that a remarkable bond between the soft rubber cover and the cylindrical bronze shell of a suction press roll can be obtained by forming on the outer surface of the bronze shell upstanding projections such as shown in Fig. 3 (1 being the bronze shell and 2 the soft rubber cover). The projections are formed by first threading the surface of the shell with 15-20 threads per in. (as in Fig. 4) and then knurling the outer surface of the shell (as in Fig. 5), thereby mushroom-

ing the outer ends of the threads. A stainless steel coating is then sprayed on, and this is followed by the rubber cover. The stainless steel coating is tightly bonded to the bronze shell, and the rubber cover may be tightly bonded to the stainless steel coating by means of a cyclized rubber cement.

Rosin-sized paper prepared from cyanoalkylated wood pulp

U.S. 2,794,736, issued June 4, 1957, to Oscar P. Cohen and John F. Heaps, assigned to Monsanto Chemical Co., describes a method of producing exceptionally hard sized paper from cellulosic materials with the use of conventional sizing agents.

The raw material for the process is obtained by mixing an ordinary wood pulp suspension with acrylonitrile or methacrylonitrile to which has been added a small amount of a polymerization inhibitor such as methyl ether of hydroquinone in the presence of an alkaline catalyst such as caustic soda.

When a dilute aqueous slurry of this pulp is treated in the usual manner with small quantities of paper size and an aluminum salt, such as aluminum sulfate or chloride, hand sheets can be prepared which show as much as a tenfold increase in sizing.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor	Patent No.	Date
Dispensing containers having strong end closures	Bergstein Package Trust	2,791,364	5/7/57
Nestable fiberboard container	Isadore Cohen	2,791,365	"
Packing case	Wilbro Corp.	2,791,366	"
Collapsible container	Robert R. Mefford	2,791,367	"
Collapsible box with handle	Gardner Board & Carton Co.	2,791,368	"
Means for protecting packed merchandise	Richard E. Paige	2,791,369	"
Felt backing for linoleum, etc.	Congoleum-Nairn Inc.	2,791,502	"
Sheet coated with remoistening adhesive composition	Hudson Pulp & Paper Corp.	2,791,512	"
Rosin size fortifying agent	American Cyanamid Co.	2,791,528	"
Multi-wall bag	Arkell Safety Bag Co.	2,792,326	5/14/57
Files for the storage of papers	Allen L. Grammer	2,792,981	5/21/57
Partition tray	George V. Malmgren	2,792,982	"
Opener for milk cartons	John H. De Lano	2,793,549	5/28/57
Folding box construction	Constantine J. Papadopoulos	2,793,801	"
Combined shipping and display box	Avey Corp.	2,793,802	"
Non-curling gummed paper	Nashua Corp.	2,793,966	"
Machine for feeding collapsed bottle cartons	Atlanta Paper Co.	2,794,374	6/ 4/57
Paper cup construction	Raymond G. Olson et al.	2,794,545	"
Cartons for coiled insulated electrical conductor wire	William G. Miller et al.	2,794,546	"
Three-bottle collapsible carrier	Lengsfield Brothers Inc.	2,794,571	"
Bottle carrier	International Paper Box Co.	2,794,572	"
Lower end construction for fiber drums	Continental Can Co. Inc.	2,794,584	"
Paperboard tray	Kenneth E. Wagner	2,794,585	"
Container for piston rings	Brown & Bailey Co.	2,794,586	"
Blank for folding boxes	Robert Gair Co. Inc.	2,794,587	"
Closures for paperboard containers	Crown Zellerbach Corp.	2,794,588	"
Envelope	Mari Souval	2,794,589	"
Mailing envelope	Paul C. Sills Jr.	2,794,590	"
Collapsible bottle carriers	Gardner Board & Carton Co.	2,795,352	6/11/57
Cartons	Aktiebolaget Akerlund & Rausung	2,795,364	"
Dual purpose pull strip for fiber containers	American Can Co.	2,795,366	"
Handle for a box	Irving Feldman et at	2,795,367-9	"
Method of making tight cartons	The Bergstein Packaging Trust	2,796,007	6/18/57
Manufacture of envelopes	John Dickinson & Co. Ltd.	2,796,008	"
Reclosable containers	Paul Graybill	2,796,212	"
Tray with separate partitions	Container Corp. of America	2,796,213	"
Joint for paperboard sheets	Joseph L. Waters	2,796,638	6/25/57
Machinery for producing tobacco filter strands from pulp	Paul A. Muller	2,796,810	"

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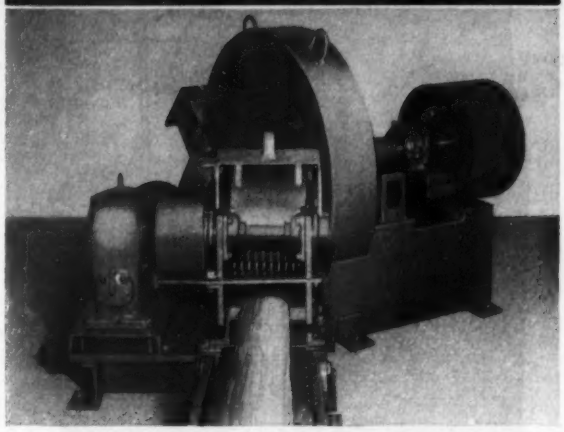

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These unions are available in two types: for expanding in sizes ½-in. thru 1½-in. and for welding or brazing in sizes ½-in. thru 2-in. These fittings are manufactured by *Horace T. Potts Co.*

Circle No. 12 on Readers' Service Card

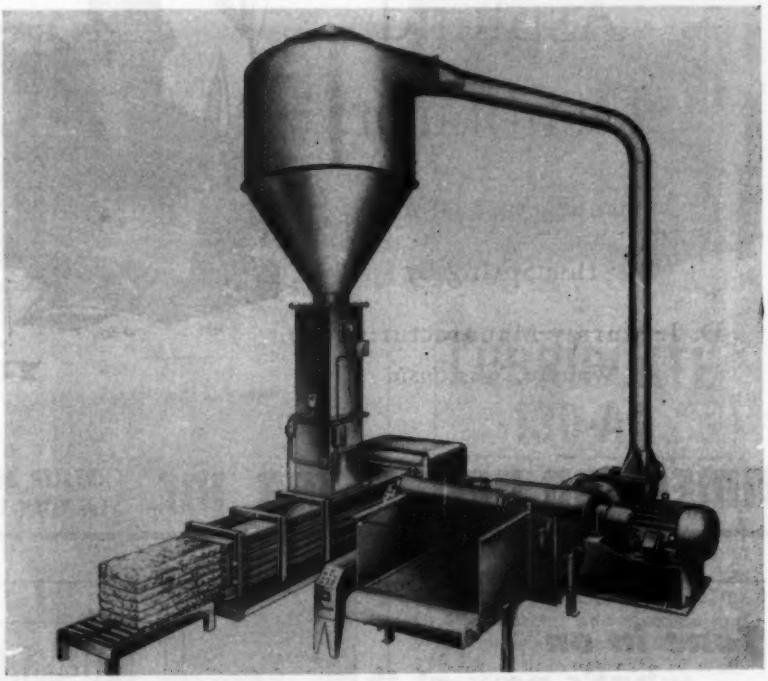
Aluminum step ladders

Pictured here is a newly-constructed lightweight, non-corrosive aluminum ladder.

The solid, ribbed aluminum steps give the user added security and confidence.

An important feature in this ladder is the smooth-rolling, ball-bearing casters which permit the ladder to be moved about easily. The casters automatically retract when the ladder is stepped on. The rubber-tipped legs then insure safe, four-cornered support. Sturdy handrails for added safety are offered on the 3- and 4-step models. These ladders are available in four sizes and seven models. *Ballymore Co.*

Circle No. 13 on Readers' Service Card

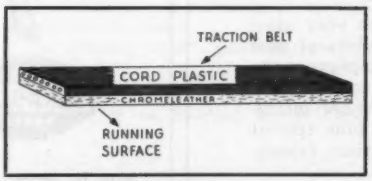


Automatic scrap handling and baling system

A new automatic multi-stage scrap paper handling and baling system was recently introduced to the market.

This system, called the Cyclomatic system, combines both pneumatic and hydraulic principles into a complete, continuous, automatic operation for scrap handling and baling. It is said to eliminate practically all of the high labor costs involved in collecting and baling scrap besides improving the baling operation and value of finished bales. *East Chicago Machine Tool Corp.*

Circle No. 11 on Readers' Service Card



Transmission belt

The photo shows a cross-sectioned view of a new transmission belt called the Twin-Layer Miracle Alphaflex.

The belt is ¼ to ½ in. wide compared to conventional flat belts but is said to be stronger, practically stretch-free and longer lasting. *Costa International Corp. Inc.*

Circle No. 14 on Readers' Service Card

Antifoam for coatings and adhesives

A versatile new antifoam and leveling agent for coatings and adhesives has been developed.

Called Hodag Antifoam TBX, this liquid is widely effective for systems based on starches and dextrines, natural proteins such as casein, glue, soya and synthetics—latexes, methyl cellulose, polyvinyl alcohol and carboxymethylcellulose.

This antifoam can be added during mix-

This is our 200th Asplund Defibrator,

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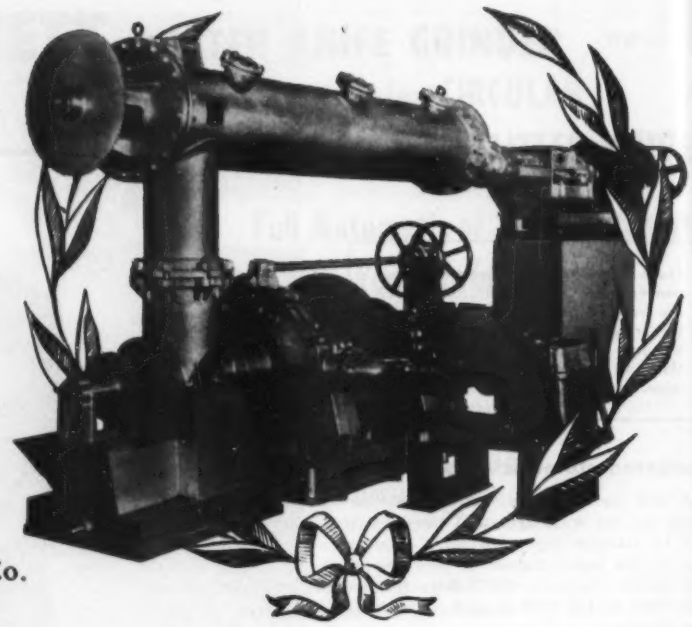

AMERICAN DEFIBRATOR, INC. CHRYSLER BUILDING NEW YORK 17, N.Y. West Coast: A. H. Lundberg Orpheum Building, Seattle, Wash.

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Make your plans *now* to attend with your associates. Plan on seeing over 500 exhibits of new developments . . . new cost-cutting improvements . . . new products and techniques that can help you in your own operations. Process equipment, instrumentation, packaging and handling, plus special sections on chemicals and raw materials, laboratory equipment and supplies.

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RESLIN *wire saver*

Suction Box Covers now lead

No other Suction Box Cover offers you so many advantages . . . that's why Mill after Mill have joined the fast growing parade of users.

PROVEN BY TEST, this RES-LIN Suction Box Cover is establishing a new record for longer life and even wearing. It is engineered to meet the requirements of specific production problems of each particular paper machine.

1. Even distribution of fabric assures EVEN WEARING.
2. Ends of threads contact wire, assuring uniform surface to wire.
3. Increased wire life.
4. Many years of trouble-free service.
5. Resurfacing reduced to a minimum.
6. Expansion and contraction is reduced to a minimum.
7. Reslin can supply a greater open area without sacrificing strength.
8. Requires no wet storage or care when machine is down.
9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

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Write for Further Information and Sample of Material

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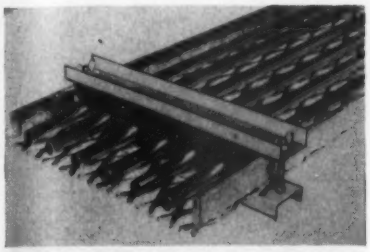
ing or milling operations or to finished coatings to prevent "fish-eyes" or "pin-holes" when applied. *Hodag Chemical Corp.*

Circle No. 15 on Readers' Service Card



Clamp secures instrument tubing in trough

Here is a clamp which has been developed to secure instrument tubing to the tubing support when particular care must be used to minimize vibration.

The clamp consists of two pieces of sponge neoprene with nitrogen-filled voids to prevent moisture absorption. Two wing nuts draw the clamp tight in place over the pieces of tubing. *Rome Cable Corp.*

Circle No. 16 on Readers' Service Card

Shaft-mounted drive

An all-steel shaft-mounted drive is now available in single reduction ratio of 5:1 and in two double reduction ratios of 14:1 or 25:1. Unit ratings range from 2 hp at 5 rpm to 50 hp at 359 rpm. Maximum torque rating at low-speed shaft is 31,000 lb-in.

A cut-away view of this drive is shown in the photo. An automotive-type dip stick is also provided for a quick check of oil level. *Falk Corp.*

Circle No. 17 on Readers' Service Card

Paper machine drive

A new paper machine drive has been introduced to the paper industry. The drive is engineered to meet each mill's specific requirements, yet these units are made up entirely of standard "off the shelf" components.

The units are currently offered in sizes from 12 to 40 hp. Larger and smaller units can be provided on special order. *Layton-Greenfield Inc.*

Circle No. 18 on Readers' Service Card

Device to examine surface of paper

A new instrument called the Photo-macrographic Camera is now on the market and is used in examining any flat surface for quality control.

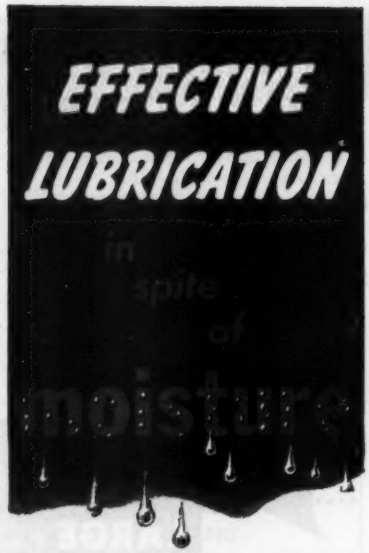
Extremely portable, the camera may be used any place where a flat surface of 12 × 14 in. and 110 volts are available. It is unnecessary to cut special samples of the work, and no special mounting is required to examine the piece.

The company invites your requests for more information about this camera. *Erdco Eng. Corp.*

Circle No. 19 on Readers' Service Card

Immersion-type thermostat

Announcement has been made of a new immersion-type thermostat for use where close temperature control is essentially up to 300°F. and where there is a sensitivity



LUBRIPLATE 130-AA

affords machine parts and bearings real protection against rust and corrosion. It is a grease type lubricant that possesses the utmost in water and acid resistance. It has exceedingly high film strength. Due to the marked adhesiveness and water resistance of LUBRIPLATE 130-AA, it does not wash off readily, hence is the ideal lubricant in the presence of moisture.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

New Products . . .

of temperature change as low as a fraction of a degree such as required in processing operations. *Alloy Bellows Inc.*

Circle No. 20 on Readers' Service Card

Sodium sulfite for control work

Normal sodium sulfite is now being made available in a new high purity for more rigid control of impurity-sensitive operations. It is available from direct stock and the price is stated to be about $1.30 per lb. and $5.00 per 5 lb. *Fisher Scientific Co.*

Circle No. 21 on Readers' Service Card

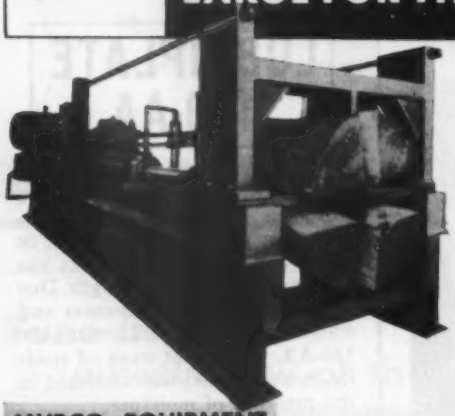
Weather-protected motors

Vertical weather-protected motors with enclosures have been designed for outdoor applications on pumps and other vertical drives. Ventilating passages are constructed to minimize the entrance of rain, snow and airborne particles with baffles to direct the flow of air in and out.

Intake and exhaust openings to air chambers are arranged so high-velocity air blown into the machine will circulate through and be discharged without entering the internal vent passages leading to electric parts. *Allis-Chalmers Mfg. Co.*

Circle No. 22 on Readers' Service Card

FOR PROCESSING LOGS TOO LARGE FOR THE CHIPPER!



MURCO

HYDRAULIC

Wood Splitter

MURCO EQUIPMENT FOR PULP & PAPER MILLS

- Barking Drums
- Multiple Knife Pulpwood Chippers
- High-Speed Wastewood Chippers
- Small Log Chippers
- Re-Chippers
- Multiple Knife Chipper Discs
- V-Type Spouts for Pulpwood Chippers
- Chip Crushers
- Knot Drills
- Level Vibrating Double Deck Chip Screens
- Knot Screens
- Stainless Steel Flat Screens
- Pulpwood Slashers
- Hydraulic Wood Splitters
- Quick Opening Gate Valves
- Roll Heading Machines
- Pneumatic Winder Shafts
- Mechanical Winder Shafts
- Hydraulic Roll Lowering Tables
- Power Dam Gate Hoists

- CAPACITY APPROXIMATELY 1 LOG PER MINUTE. This is based on the calculation that it takes approximately 30 seconds to load the machine with the log to be split.
- OVERALL DIMENSIONS OF SPLITTER FOR 36" DIAMETER WOOD 5'3" long are 21' long x 5'2" wide, x 5'8½" high.

The MURCO Hydraulic Wood Splitter has been designed for pulp mills processing logs that are too large in diameter to be handled by the chipper. So that handling and the number of operations are reduced to a minimum, this splitter is equipped with a Star type stationary axe that quarters the wood at one stroke.

WRITE for proposal and quotations to meet your pulpmill requirements . . . specify maximum diameter and length of wood to be split.

MURCO

D. J. MURRAY MANUFACTURING CO.

Manufacturers Since 1883 WAUSAU • WISCONSIN

Crane to speed up loading and stacking operations

The photo shows the Bantam CR-35 crane in operation. Operated by one man, this crane is said to load a three-cord mill wagon with 8-ft. poplar sticks in 5-7 min.

One of the many features of the crane is the fast swing speed and accurate control of the grapple. This feature should prove a cut in the cost of handling labor in yard. *Schield Bantam Co.*

Circle No. 23 on Readers' Service Card

Wiring raceway

The photo shows a new Panel Chanel wiring raceway being subjected to direct flame. This raceway is made of a tough reinforced phenolic and is said to be immediately self-extinguishing when subjected to direct flame.

The new composition is lightweight,

New Products . . .

durable and does not wrap or sag even under high temperatures normally encountered in panelboards. All sizes and styles of Panel Chanel raceway now being manufactured and shipped are utilizing the new material. *Stablin Brothers Inc.*

Circle No. 24 on Readers' Service Card

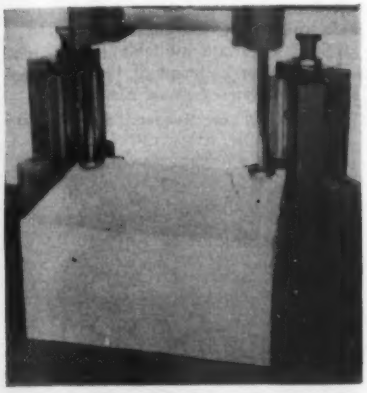


Fig. 1

Fig. 2

Machine for cutting corners on paper or board

A machine capable of cutting two precision rounded corners at one time on paper or board is now being manufactured.

The unit is designed to cut paper or board up to 6 in. high and from 5 to 16 in. wide with precision by automatically self-adjusting for variations in size of stock up to 5/8 in.

Standard equipment includes two knives and two dies of any radii from 3/8 to 3/4 in. in increments of 1/16 in. This machine can also be equipped to cut diagonally straight corners up to 2 in. long.

Note the space between the paper and the right hand floating knife assembly in Fig. 1. Here, both knives are up, and the stack of paper is placed against back guides. Fig. 2 shows the same stack after cutting. Both knives are down, and you can see that the space between the paper and floating knife has disappeared as the unit has adjusted itself to the exact width of the paper.

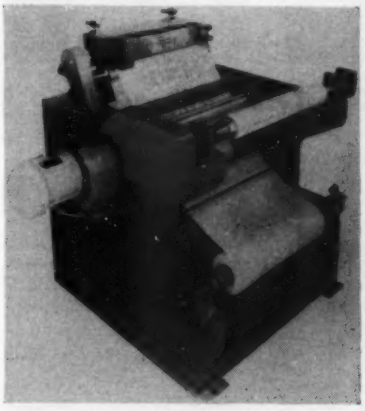
The company welcomes your requests for more detailed information on this new machine. *W. O. Hickok Mfg. Co.*

Circle No. 25 on Readers' Service Card

Filter-separator for use in fuel, oil, solvent and water treatments

A new rugged filter-separator is stated to remove condensed water, water-borne contaminants and solids from fuels, oils, solvents and other oleaginous liquids at flowrates of from 5 to 40 gpm with 100 per cent effectiveness. It is also suitable for a wide variety of aqueous solution treatments. *Richmond Eng. Co.*

Circle No. 26 on Readers' Service Card



Winding machine with printing attachment

Designed for easy attachment to a winding machine, the unit pictured above is powered from the variable-speed main drive of the parent machine. It comprises a single-shaft unwind and rewind stand suitable for use with both the Imagraph and Rolaprinter machines.

The web width to be handled is 24 in. with core diameter of 3 in. and finished roll outer dimension of 9 in. The speed ranges from 40 to 100 fpm. The complete winding units is supplied by *Hobbs Mfg. Co.*

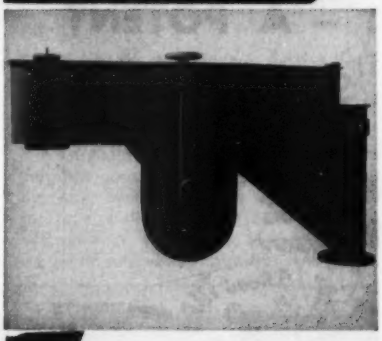
Circle No. 27 on Readers' Service Card

Wedge-lock seals with interchangeable parts

Both external and internal mechanical seals are now being offered with interchangeable parts for any given shaft size.

These seals give highly economical service on pumps handling acids, caustics and other liquids and slurries at temperatures from 80°F to 500°F, from vacuum to 100 psi. Seal faces are always within the stuffing box, eliminating dangerous spray haz-

POIRIER
Counterflow



CONSISTENCY AND BASIS WEIGHT REGULATOR

Poirier's Counterflow Regulator is guaranteed to prevent basis weight variation regardless of incoming consistency.

To you, this means more uniform finished paper, quicker, easier and more economical.

HERE'S WHY: —

* Basis Weight controlled to within 2% (+—); consistency 1/10 of 1%.
* Volume regulated even when stock is too light to be controlled by consistency.
* No moving parts.
* Outgoing consistency may be controlled to as low as .5%.
* Operates on all tonnages and grades.
* May be applied from knotters to paper machine.
* Position available for attachment of part of Poirier Machine Variation Control.

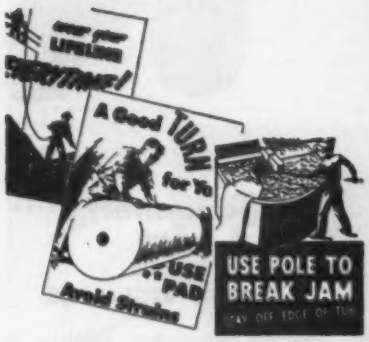
Let our engineers study your operation and furnish you with complete details on how a Poirier Counterflow Regulator will help you as it has others. No cost — no obligation.

Write for full information

POIRIER CONTROL COMPANY
Waterville 9, Maine

Specialists in Stock Control Equipment

POSTERS — A POTENT SAFETY TOOL



Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in two sizes: "A" size, 8½" x 11½", and "B" size, 17x23". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave.
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New Products . . .

ards. Flushing, cooling and/or lubricating can be supplied on all seals. *Chemical & Power Products, Inc.*

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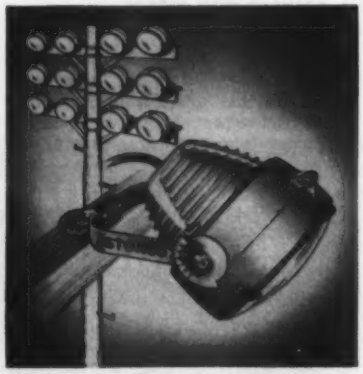
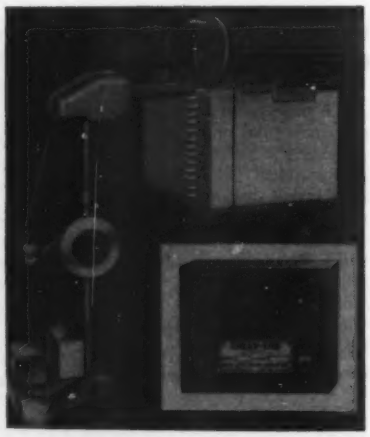


High-powered floodlight

The illustration above shows a new type high-powered floodlight that can be used in lumber yards, as night lights around the plant, etc.

The light is designed for long-throw coverage of wide field areas and utilizes a 500-watt powerbeam projector bulb sealed inside a cast aluminum housing with a heavy plated steel trunion bracket. *Stonco Electric Products Co.*

Circle No. 29 on Readers' Service Card



Automatic counter and tabber

Known as the Tally-Tab 1000, this unique unit completely eliminates the necessity of hand counting, lowers operating costs and provides the machine operator with an accurate, positive means of tabbing a pre-determined quantity of pieces coming from a machine.

The machine gives instantaneous selection of any count from 1-1000 at speeds up to 350 rpm. Counters are available for higher speeds at slight additional cost. *Miller Lauffer Printing Equipment Corp.*

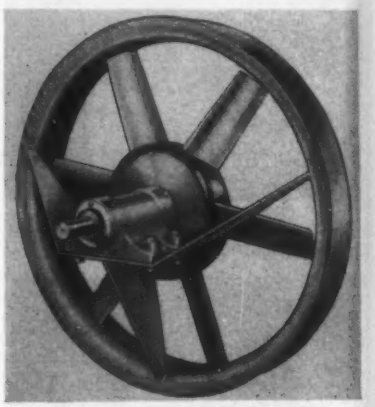
Circle No. 30 on Readers' Service Card

Silicone-insulated wires

Type RHH wires have been developed with silicone insulation. It is stated by the company that because silicone insulation has greater resistance to heat, these wires, consequently, have longer life. The added heat resistance makes them especially suited to power and lighting installations in factories with heat-problem areas.

These wires are available in the same range of sizes as standard butyl-insulated Type RHH wires. *General Electric Co.*

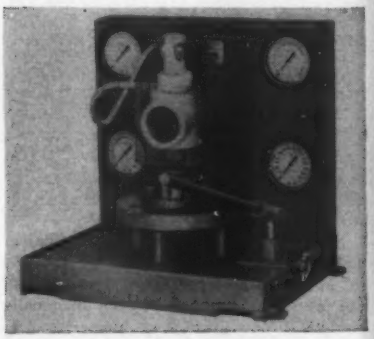
Circle No. 31 on Readers' Service Card



Belt-driven orifice ring fan

A versatile new belt-driven orifice ring fan has been designed and is known as the type PD. This type incorporates an oversized shaft to accommodate maximum horsepower used and is suitable for V-belt or flat adapted to crop drying, cooling of special equipment, or exhausting of various acids and fumes. *Chicago Blower Corp.*

Circle No. 32 on Readers' Service Card



Hydraulic and pneumatic test stand

Called Porta-Tester, a new bench-type hydraulic and pneumatic test stand has

New Products . . .

been developed for use wherever pressure equipment must be tested without an external source of power.

The unit is designed for testing safety valves, relief valves, globe, gate, plug and other valves, pressure vessels, piping and pump cases.

As shown in the photo, the unit is furnished with mounting adapters, hand pump and gauges, and an air connection is provided for seat-leakage testing. *Farris Engineering Corp.*

Circle No. 33 on Readers' Service Card

Magnetic stirrer

This new model stirrer offers complete control mixing of liquids up to 3 gal. Any glass, porcelain, nonmagnetic metal or plastic vessel can be used open or closed or even sealed under vacuum or pressure.

The unit measures 9 in. diameter at top, 9 1/16 in. at bottom and is 6⅜ in. high. Three sturdy rubber feet make the unit wobble-proof. *Fisher Scientific Co.*

Circle No. 34 on Readers' Service Card

Dollies for moving skids

Multiton Junior is a complete moving kit being offered to the industiy for moving machinery, products and equipment up to 6000 lbs.

This kit is supplied with dollies which are positioned under the load as needed and is also equipped with swivel heads which hold the load steady while the dolly can be turned to a full 180°. The complete kit includes the four roller dollies, four swivel heads, cast-aluminum arm for turning the dolly, two tandem connectors and the two-handled, sheet steel carrying case. *Stokvis-Edera & Co.*

Circle No. 35 on Readers' Service Card

Lining material for rotary kilns

A 70 per cent alumina brick has been made available for lining rotary kilns.

The brick is said to have an extra-high density with low porosity and high strength. This gives increased resistance to abrasion and chemical attack.

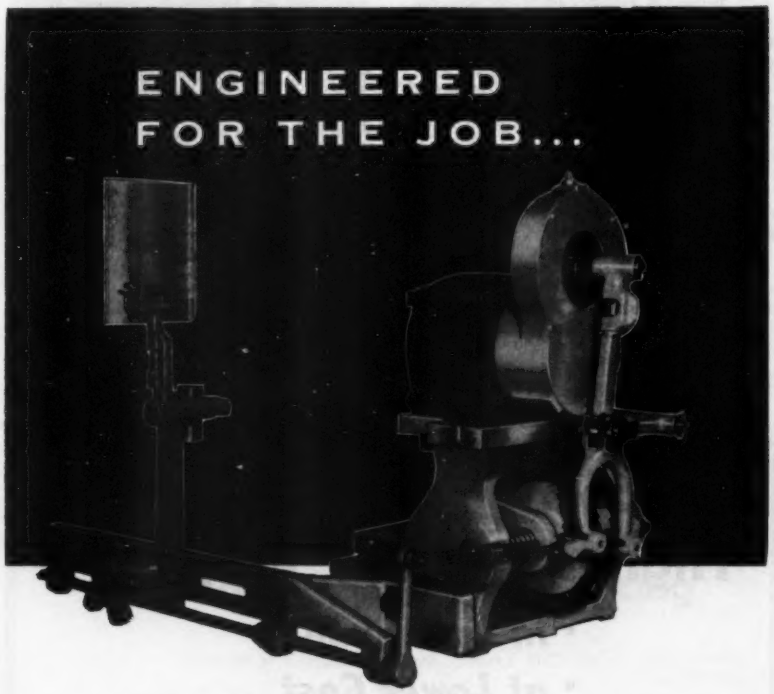
This brick is especially suitable for use in cement and lime kilns. *Ironton Fire Brick Co.*

Circle No. 36 on Readers' Service Card

Industrial skylight

A prefabricated skylight which selects only the most desirable rays of sunlight the year 'round has been made available for paper mills and office buildings.

Known as Toplite, the device is based on use of solar-selecting prisms which open



**Model 405 wire guide—
like all Gilbert and Nash guides*—
is engineered for the job!**

Dependability **is a built-in characteristic of Model 405 . . . increasing or reduction gear, speeds from 50 to 1200 f.p.m., anti-friction bearings, feather-touch palm. Low initial cost, low maintenance costs make Model 405 an economical installation, too.**

Discuss *your* guiding requirements with a technically-trained Gilbert and Nash representative.

GILBERT and NASH company

*Manufactured and sold exclusively by The Appleton Machine Company • Appleton, Wisconsin

New Products . . .

and close to admit only cool, even light while rejecting the sun's hot rays.

Toplite provides the maximum uniform illumination, helps reduce artificial light costs, eliminates glare and reduces solar heat transmission during hot summer months. *Kimble Glass Co.*

Circle No. 37 on Readers' Service Card

Paper cutting machines

Lawson Co. is now manufacturing heavy-duty hydraulic clamp cutters in 60-, 66- and 69-in. sizes. These larger cutters have been specifically engineered and designed for use by paper mills and converters. They will also offer many new features not previously available in mill cutters. *E. P. Lawson Co.*

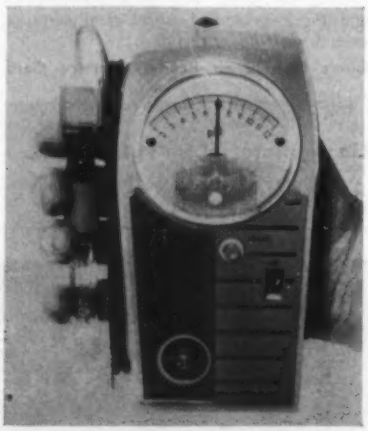
Circle No. 38 on Readers' Service Card

Powdered detergent

An all-purpose, concentrated, powdered detergent has been developed which is said to exhibit excellent cleaning properties and yet will not harm the hands.

This detergent is known as Kelite A-P-C. The company states that it has high-sudsing and high-suds-staying power and is safe on all commonly-found surfaces. It is recommended for cleaning floors, vehicles and equipment. *Kelite Corp.*

Circle No. 39 on Readers' Service Card

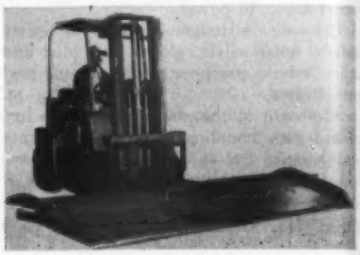


Pocket pH meter

Anyone can use this lightweight, portable instrument after reading brief simple instructions on back of case. It is an excellent tool for spot checking feed pulp pH, or to double check process pH meters.

A unique feature of the meter is the combination glass and reference electrode with a convenient 36-in. lead. The electrode may also be used while still clamped to the instrument's side—allowing the operator a free hand to make notations. *Beckman Instruments Inc.*

Circle No. 40 on Readers' Service Card



Industrial bridge ramps

All-steel, extra-heavy-duty ramps are now available with 22,000-lb. axle load capacity.

Because of the development of heavy-duty lift trucks being built for heavier loads, the company has found it necessary to supply the industry with an extra-heavy-duty ramp which will have the necessary strength.

The ramp illustrated in the photo is 9 ft. at car door and 13 ft. at dock with length of 5 ft. The photo illustrates the dual lifting stirrups built in for fork truck moving. The company states that the ramp is engineered and designed to meet all safety requirements. *Roll Rite Corp.*

Circle No. 41 on Readers' Service Card

Amphibious fork truck

Officially designated a "rough terrain fork truck" and nicknamed the "Ranger", this truck is able to climb sand dunes, pulls itself out of holes, drives sideways and reaches for its load and then holds the load on an even keel over any terrain.

Designed to Army specifications, the Ranger will operate in 5 ft. of water, and with both front and rear axle steering it can move sideways at a 20° angle.

Commercial versions of these trucks are being manufactured for use in lumber and other industries. *Clark Equipment Co.*

Circle No. 42 on Readers' Service Card

Greater Production of Higher Quality Pulp

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• *at Lower Cost*

This is the end result of the various processes and equipment which we have installed in pulp mills throughout North America. Send us details of your requirements.

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Mercer Island, Wash.

Lundberg-Ahlen Equipment Ltd.
146 E. Broadway, Vancouver

NEW LITERATURE

Books

HANDBOOK OF CHEMICAL DATA. Edited by F. W. Atack. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 629 pages $6.75.

This is a pocket-size handbook which contains a vast selection of facts which are needed daily by all chemists in their work.

Because of its convenient size, which is 6¼ in. x 4 in., the chemist can easily carry it around at all times and have the necessary information available at hand.

The book is filled with relevant tables of physical constants and properties along with other needed facts.

ATLAS OF PAPER MAKING FIBRES. Published by Guildhall Publishing Co. Ltd. 2 Wrentham Ave., London, N. W. 10. $8.85. 172 pages.

The author has designed this work primarily for readers who are actually employed in the scientific investigation of paper problems, and to bring together between the covers of one book notes on the use of the microscope and the procedure of recording observations through the medium of photography.

This scheme has been followed, and the formula and methods of use of the more frequently-employed stains and reagents are described in the hope that, as a result, readers will find it possible to develop their own skill as microscopists.

A list of other books published on this subject or related subjects for further reading is found in the back of the book.

The book is very well illustrated and the text gives good basic information on the subject.

USDA Reports

SILVICAL CHARACTERISTICS OF BLACK SPRUCE. This report is another of the series being prepared by the Lake States Station covering the information concerning the silvical characteristics of different species. This particular report deals with the Black Spruce species. It is a 30-page booklet prepared by M. L. Heinselman. Copies are available from: Lake States Forest Experiment Station, St. Paul 1, Minn. Ask for Station Paper No. 45.

Booklets and Pamphlets

FIVE-MINUTE SAFETY TALKS FOR FOREMEN. Published by the National Safety Council 425 North Michigan Ave., Chicago 11, Ill.

There are 52 talks on accident prevention in this booklet. They were prepared by Roland F. Blake, a leader in safety engineering and editor and co-author of Industrial Safety—a book on accident prevention fundamentals.

The up-to-date material in the booklet includes such varied topics as vacation safety, smoking, horseplay, how to use a screwdriver, lung safety and hot weather hints.

At the beginning of the booklet there are two pages devoted to the planning of the meetings and how to properly use these helpful talks.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Custom-made centrifugal castings

Sandusky Foundry & Machine Co. is issuing a new catalog offering information on custom-made centrifugal castings in more than 70 different alloys including stainless steels, plain carbon and low-alloy steels, monels, cupro-nickels and copper base alloys and in sizes ranging from 7- to 54-in O.D. The catalog is designed to be of use to key officials who plan specifications for centrifugally cast parts.

Circle No. 43 on Readers' Service Card

Preparing pulp for shipping or storage

Bauer Bros. Co. has published an 8-page booklet explaining the new Bauer-Bale system of preparing pulp for shipment or storage. The booklet describes the five basic steps used to reduce pulp from the 14-per cent to 17-per cent solid range to 95 per cent dry and produce compact, easy-to-handle bales. It includes a diagram and description of a typical installation, showing the arrangement of the continuous screw press, single-disc mill, pulp dryer and baling press used in the system.

Circle No. 44 on Readers' Service Card

Motion picture on ground water development

Layne & Bowler Inc. has portrayed how water reaches the underground formations with animated sequences of underground processes in a full-color 16mm motion picture film. It shows how water is located and the processes necessary for its production in ample quantities.

Now available in book form

Technology of Paper Coating

by H. Witcoff
Director of Chemical Research, General Mills Inc.

and A. W. J. Dyck
Editorial Director, The PAPER INDUSTRY

The latest developments in the technology of paper coating are brought to the reader clearly and concisely in this new book that is based with some revision on a series of articles appearing in The PAPER INDUSTRY from May 1956 through May 1957.

The up-to-the-minute techniques in general use are described in detail. Various specific methods of on-the-machine and off-the-machine coating processes are described and illustrated. Of major importance is the discussion of properties and uses of new as well as established organic and inorganic coatings in wide and specialized usage. A number of typical formulations are shown.

Price $2.00 prepaid with order

Published by FRITZ PUBLICATIONS INC.

431 South Dearborn Street, Chicago 5, Illinois

It also shows drilling rigs in action, setting and cementing, casing, setting and graveling screen and test pumping the well. The film runs 22 min. and is available to groups for showing without cost.

Circle No. 45 on Readers' Service Card

Corrosion-resistant PVC pipe

Alpha Plastics Inc. describes the firm's regular and high-impact corrosion-resistant rigid polyvinyl chloride pipe in a 12-page catalog now available from the company. Included in the catalog are tables of pipe sizes available, specific chemical applications, physical properties, temperature factors for various working pressures, support spacing and thermal expansion.

Circle No. 46 on Readers' Service Card

Maintenance of concrete floors

Multi-Clean Products Inc. offers a bulletin at your request which details step-by-step treatment and maintenance procedures for both old and new concrete floors. Application techniques are illustrated, and the bulletin is summarized with a listing of equipment that can make concrete floor maintenance an easier task.

Circle No. 47 on Readers' Service Card

Handling of chlorine liquid and gas

Fischer & Porter Co. has just issued a technical bulletin on the handling of chlorine liquid and gas from container to dispenser. The booklet gives pertinent facts about chlorine, lists safety precautions and outlines recommended practices for designing and constructing chlorine supply systems.

Circle No. 48 on Readers' Service Card

Overhead cranes

Manning, Maxwell & Moore Inc. gives a complete description of the company's overhead cranes in a new 28-page bulletin. The company states that the bulletin is designed for the engineer or layman to quickly and easily select the exact crane to meet his particular job requirements and get the information necessary to evaluate its features and design advantages.

Circle No. 49 on Readers' Service Card

Chemical processing machinery

J. H. Day Co. has published a 4-page bulletin describing the company's mixers, blenders, sifters, roll mills and other chemical processing machinery. Photos and specification tables are also given.

Circle No. 50 on Readers' Service Card

Hose fittings

Hose Accessories Co. has published an 8-page bulletin describing and illustrating Le-Hi brass hose fittings for low-and medium-pressure service in conveying air, spray, steam, suction, water, welding, etc.

Circle No. 51 on Readers' Service Card

Tube winding with silicate adhesives

Philadelphia Quartz Co. has issued a two-page bulletin entitled, "Tube Winding with Silicate Adhesives." Silicate adhesives are adaptable to the forming of convolute tubes of ½-in. to 24-in. diameter. Three adhesive-type silicates are described in terms of alkali-silica ratio, viscosity and degree of wetting and penetration obtainable.

Circle No. 52 on Readers' Service Card

Blowers, gas pumps and vacuum pumps

Sutorbilt Corp. gives a description of the company's blowers, gas pumps and vacuum pumps in an 8-page bulletin now available. The bulletin presents 22 photographs showing various pieces of equipment and disassembled parts along with technical descriptions.

Circle No. 53 on Readers' Service Card

Wetting agents and penetrants

Mona Industries Inc. has released a bulletin describing Monawet MM-80 per cent, which is chemically the sodium salt of the di-hexylsolfosuccinic acid. MM-80 per cent is closely related to Mona's Monawet MO-70 per cent but possesses better hard water and salt resistance. It has application in the paper industry when treating paper with inorganic salt solutions.

Circle No. 54 on Readers' Service Card

Corrosion-resistant lining

Poncono Fabricators Inc. thoroughly discusses an inexpensive and enduring solution to costly corrosion problems in industry in a new bulletin. Formula C-17 Pre-Krete is a low-soluble cement-base lining widely used in lining the interiors of steel water heaters, tanks, vats and other vessels handling bulk liquids.

Circle No. 55 on Readers' Service Card

Binder for coatings

Goodyear Tire & Rubber Co. is offering a data sheet describing a new product known as Pliolite VT. This vinyl toluene/butadiene resin has been developed specifically as a solution binder for coatings. A price list is also included with the data sheet.

Circle No. 56 on Readers' Service Card

Pressure regulators

Crane Co., in a new bulletin, describes the features of the company's No. 960 regulators for pressure control of air or steam at up to 250 lb. and 450° F. The bulletin also includes two pages of easy-to-use tables for selecting the proper size pressure regulator, plus a page of diagrams and tips for making better installation.

Circle No. 57 on Readers' Service Card

High-temperature oil

Lehigh Chemical Co. has announced the development of an extreme high-temperature oil called Anderol L-825. This oil is designed for use on conveyor belt operations where operating conditions and temperature ranges require an exceptionally versatile lubricant. Further technical details are available from the company.

Circle No. 58 on Readers' Service Card

Steel chain and sprockets for pulp mills

Poor & Co. has released literature on wear-resisting manganese steel chain and sprockets for pulp mills. Two barking drum chains, four combination chains with attachments and renewable-tooth sprockets are described. Other features and construction are described.

Circle No. 59 on Readers' Service Card

Air-operated valves

Conoflow Corp. has just issued a new bulletin describing the company's complete line of air-operated Saunders patent-type valves. Eight pages give construction details and operating characteristics of the series.

Circle No. 60 on Readers' Service Card

Protective coatings for equipment exposed to critical service

Metalweld Inc. is making available to the industry a new data sheet which lists the physical and chemical resistances of Neoprene sheet. Neoprene linings can be applied to tanks, ducts and other equipment exposed to critical service.

Circle No. 61 on Readers' Service Card

Paste-type, water-base antifoam

National Aluminate Corp. has recently announced a new water-base, paste-type antifoam. Advantages of the product are said to be its economy, and the fact that it will not polymerize

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Graduate Industrial Engineer with practical experience in the paper industry. A knowledge of paper finishing is desirable. Should have ability in organization, expansion, mechanization and labor relations. Under 38 years of age, good salary and benefits. Fine opportunity for a man who is energetic and desires a challenge. Send detailed resume of experience and education to Personnel Manager, West Virginia Pulp and Paper Co., Luke, Maryland.

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Technology of Paper Coating	2.00
Lessons in Papermaking—Part 1	1.50
Lessons in Papermaking—Part 2	1.50
Notes and Observation on Beaters	1.00
Trouble on the Paper Machine	.75
Technology of Papermaking Fibres	.50

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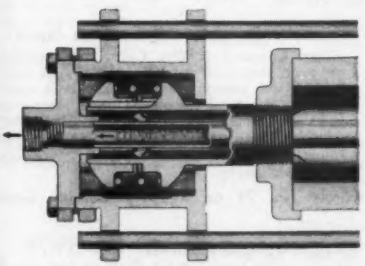
ROD-SUPPORTED TYPE

The Type LJ Johnson Joint has lugs cast right on the body to accommodate supporting rods. This design lifts the weight of the body from the rotating assembly—permits it to "float" freely inside. Joint shown at left is for syphon pipe service, has steam inlet in side of body 90° from lugs. Type LJ is also available for thru flow service.



Write for complete information. Johnson Joints are also furnished in pipe-supported and self-supported types.

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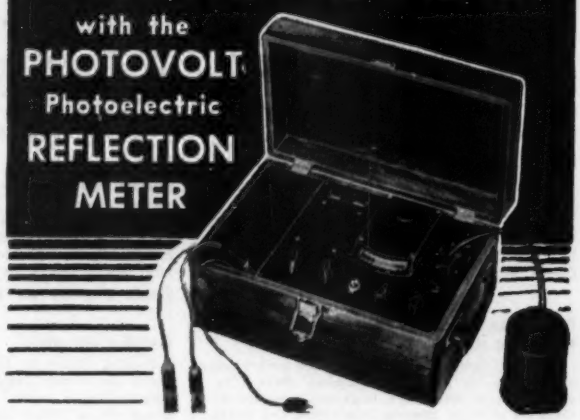

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Ask your Dealer or Write for Information.

SINCE 1887

SAMUEL C. ROGERS & CO., INC.

2070 SHERIDAN DRIVE BUFFALO 23, N.Y.

on press or couch rolls. The company invites your requests for a technical data sheet on this product.

Circle No. 62 on Readers' Service Card

Hose clamps for crucial applications

Ideal Corp. has published a data sheet telling details of the company's hose clamps. Diagrammatical drawings and charts for ordering are given in the bulletin.

Circle No. 63 on Readers' Service Card

Film catalogue

Westinghouse Electric Corp. has titled a new booklet "Westinghouse Sound Films", and is offering the booklet at your request. The booklet is a catalog of 47 general-interest films, product information films and training films.

Circle No. 64 on Readers' Service Card

Pocket-size slide chart on machining stainless steels

Carpenter Steel Co. is offering a new pocket-size slide chart on machining stainless steels. The chart tabulates speeds and feeds and gives special notes on drilling, tapping, lubrication and welding. Other types of information are also printed on the chart.

Circle No. 65 on Readers' Service Card

Dryers and dryer sections

Sandy Hill Iron & Brass Works is issuing a bulletin describing the construction of the dryers and dryer sections which are manufactured by the company.

Circle No. 66 on Readers' Service Card

Gaskets and "O" rings

Crane Packing Co. tells of its complete line of gaskets, back-up rings and "O" rings in a new bulletin just published. Information includes service and mechanical recommendations, data on operating pressures and standard sizes and dimensional details.

Circle No. 67 on Readers' Service Card

Automatic handling and baling of scrap paper

East Chicago Machine Tool Corp. tells of the company's new cyclomatic system for the automatic handling and baling of scrap paper in a 12-page brochure.

Circle No. 68 on Readers' Service Card

Release coating for papers

Dow Corning Corp. has developed two new anti-adhesive silicone treatments for paper and paperboard. Data sheets on each are available from the company. These sheets give full technical descriptions of the chemicals.

Circle No. 69 on Readers' Service Card

Catalog on valves

Darling Valve & Mfg. Co. invites your requests for a new 244-page catalog covering the company's gate valves, check valves and fire hydrants in a broad range of types, sizes and constructions. The catalog covers the company's latest developments.

Circle No. 70 on Readers' Service Card

Log skidding

R. G. LeTourneau Inc. has discussed in an 8-page brochure the company's Electric Arch. Photos throughout the brochure give information on the operation features of this truck.

Circle No. 71 on Readers' Service Card

Humidification for paper products

Armstrong Machine Works is offering an 8-page bulletin which deals with the dry-air problems encountered by paper and paperboard fabricators. The bulletin tells how relative humidity affects paper moisture content, paper quality, stock losses, production difficulties, employee health and comfort and other factors. Case histories of many plants now using this system are included. Prices and installation data are also given.

Circle No. 72 on Readers' Service Card

Water filter

Green Bay Foundry & Machine Works is offering a catalog describing in detail the North water filter—fine screens for industrial use. Applications are illustrated in addition to a number of paper mill water filter installations throughout the country.

Circle No. 73 on Readers' Service Card

Two bulletins on jordans

John W. Bolton & Sons Inc. has released two bulletins describing in detail models 4K and 6K Emerson jordans. The bulletins are complete in their descriptions and illustrations of the construction and performance features of these stock preparation units.

Circle No. 74 on Readers' Service Card

Treating sewage and industrial wastes

Yoemans Brothers Co. has published a new catalog titled "The Hi-Cone System for treating sewage and industrial wastes by the activated sludge process". Two full pages tell, in detail, how the system works. Other pages are devoted to the results of detailed studies of installations.

Circle No. 75 on Readers' Service Card

Pulper

Improved Machinery Inc. invites your request for a bulletin just published concerning the company's Solvo pulper. The bulletin tells of the many features and advantages of the unit. The company has stated that this principle is a completely new method of pulping.

Circle No. 76 on Readers' Service Card

Solving an unusual case of carryover

Betz Laboratories Inc. is offering an article containing material developed from an actual case history of carryover at a Canadian mill. The paper points out the fact that the physical condition of a boiler is also important when steam conductivity goes up.

Circle No. 77 on Readers' Service Card

Precision paper knives

Simonds Worden White Co. has described the company's knife blades for all types of paper cutting operations in a bulletin which is now available. Important design and construction features are illustrated and described along with a diagram on the back page showing the knife edge bevels recommended for general purpose cutting of different type papers.

Circle No. 78 on Readers' Service Card

Anhydrous ammonia and ammonia liquor

Allied Chemical & Dye Corp. has prepared a 68-page technical data book on anhydrous ammonia and ammonia liquor. The book fully describes anhydrous ammonia and ammonia liquor — listing their chemical and physical properties, specifications, handling and storage features, unloading methods, analytical procedures and a bibliography.

Circle No. 79 on Readers' Service Card

Firing temperature control

Leeds & Northrup Co. gives complete information on the company's equipment for firing temperature measurement and control for rotary kilns in a 4-page data sheet. The data sheet gives photographs and diagrams illustrating all details of the system and its installation. A listing of ordering instructions and specifications is also given.

Circle No. 80 on Readers' Service Card

NOW IN SECOND PRINTING

PAPER AND PAPERBOARD MAKING

BY HARRY WILLIAMSON

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LESSONS IN PAPER MAKING

Pocket size, cloth bound text book of 372 pages covering all phases of stock preparation and sheet formation including the fundamental principles of making paper on the fourdrinier machine and paperboard on the multiple cylinder machine. Filled with practical papermaking know-how, this now widely-read book can be useful to the practical papermaker, technologist, and executive.

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MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.70— .75
No. 2 roofing (Chicago)	.50— .55
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites, miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	4.75— 5.00
Gunny No. 1, foreign	4.50— 5.00
No. 1 manila rope, domestic	7.75— 8.25
No. 1 manila rope, foreign	6.25— 6.50
New burlap cuts (soft)	6.00— 6.50
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	105.00—115.00
No. 1 hard white shavings	85.00— 90.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	55.00— 65.00
Fly leaf shavings No. 1	25.00— 30.00
Fly leaf, woody, No. 1	25.00— 30.00
Mixed colored shavings	18.00— 20.00
No. 1 books and magazines	17.00— 18.00
Ledger stock, white, No. 1 (carloads)	40.00— 45.00
Ledger stock, colored, No. 1 (Midwest ship)	25.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	50.00— 60.00
Colored tab cards	40.00— 50.00
New northern kraft envelope cuttings	60.00— 65.00
Triple sorted kraft, 100%	25.00— 30.00
No. 1 old kraft	25.00—
White news cuts, No. 1	50.00— 55.00
No. 1 overissue news	14.00— 16.00
Folded news, special	15.00— 16.00
Folded news, ordinary	12.00— 14.00
Old corrugated boxes	23.00— 24.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	6.00— 7.00
No. 1 mixed paper	2.00— 5.00

CHEMICALS

F.o.b. New York City

Alum, ammonium Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt	5.05—
Powdered, drums, works, cwt	5.20—
1-Arginine, drums, kilo	74.80—
Blanc Fixe Direct process, bags, c.l., works, ton	110.00—
L. c. l., ton	120.00—
Bleaching Powder, drums, cwt	
Casein, domestic acid precipitated 30-mesh bags, 10,000-lb. lots or more, shipping point, lb	.56
80-mesh bags, 10,000-lb. lots or more, shipping point, lb	.64
China Clay, domestic dry-ground, airfloat, 99% 325-mesh, bags, c. l., Georgia works, ton	10.00—
300-mesh, bags, c. l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— 35.00
Chlorine, liquid Tanks, single units, works, freight equaled, cwt	3.15—
Glycerine, refined (CP, USP) 99%, drums, c. l., delivered lb.	.29½—
Litharge, commercial powdered Barrels, c. l., works, freight equalled, lb.	.16—
Rosin, gum, c. l., f.o.b. New York, cwt E	—
P	—
G	8.75—
WW	9.40—
Rosin, wood, c. l., f.o.b., shipping point, cwt. K, M	7.60—
N	7.70—
WG	8.15—
WW	8.40—
Saltcake, domestic, bulk Works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c. l. works, cwt	1.85—
Soda, caustic Flake, 76%, drums, c. l. works, freight equalled, cwt.	4.70—
Solid, 76%, drums, c. l. works, cwt.	4.30—
Sodium Silicate 40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude Bulk, c. l. mine, contract, long ton	26.50—
Talc Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment Calcium-rutile base, regular, bags, c. l., lb.	.09¼—
High-tinting, drums, c. l., lb.	.09 —
Zinc Oxide Pigment, American process Lead-free, bags, c. l., freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	150.00—
Bleached sulfite, Canadian	150.00—
Unbleached sulfite	130.00—
Unbleached sulfite, Canadian	130.00—
Bleached soda	145.00—
Bleached soda, Canadian	145.00—
Kraft, bleached hardwood	150.00—
Kraft, bleached	152.00—155.00
Kraft, bleached southern	155.00—
Kraft, bleached Canadian	155.00—
Kraft, unbleached southern	117.50—122.50
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	130.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	
Sulfate screenings	
Groundwood, dom.	82.50— 90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	150.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	150.00—
Bleached sulfite, Finish, freight allowed	150.00—
Unbleached sulfite, Swedish, freight allowed	130.00—
Unbleached sulfite, Finnish, freight allowed	130.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	155.00—
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more): Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated .020	175.00
.018	177.50
.016	182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt): No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000-lb., ream sealed cartons): 100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons): No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons): No. 1	23.70
No. 2	22.95
No. 4	21.55
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	
Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	9.50
Butchers, counter rolls	10.50
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

Names in the News . . .

(Continued from page 623)

land, Ore. He joined the firm in 1934 in the accounting department.

Ralph M. Shaw, for the past eight years vice president in charge of sales, has been named president of MacMillan & Bloedel Ltd. He succeeds **H. S. Berryman,** who has resigned for reasons of health. Shaw's appointment culminates 30 years of service with H. R. MacMillan interests.

R. A. Irwin, formerly president and managing director of E. B. Eddy Co. at Hull, Que., has been named a vice president of Bathurst Power & Paper Co. Ltd. He will also serve as assistant to the president.

Dr. Arnold J. Hoiberg has been named assistant research director for Flintoke Co. An authority on asphalt technology, he was formerly asphalt research director for Lion Oil Co. Dr. Hoiberg will headquarter at the Flintoke research laboratory in Whippany, N. J.

Dr. A. J. Hoiberg

F. D. Gottwald Jr.

Floyd D. Gottwald Jr. has been elected a vice president of Albemarle Paper Mfg. Co. of Richmond, Va. He will retain his position as secretary of the firm. Gottwald joined Albemarle in 1943 as a laboratory assistant.

Allied Personalities . . .

Robert J. Horning has been named manager of roll grinder sales by Farrel-Birmingham Co. Inc. He succeeds **Harlan J. Hauser,** who has been made assistant sales manager of the Consolidated Machine Tool Div. Horning was previously a New England sales representative.

Kenneth C. Towe, since 1952 president of American Cyanamid Co., has been elected to the newly created post of chairman of the board of directors. Succeeding him as president and chief executive officer is **Dr. Wilbur G. Malcolm,** formerly vice president for marketing.

Gerry Boas, with wide experience in paper converting and converting machinery, has recently joined the sales department of Black-Clawson (Canada) Ltd. in Montreal. He will be concerned with Dilts converting equipment, including slitter rewinders for paper machine applications.

Robert E. Davies, since 1950 construction superintendent for the Chemical Plants Div., has been named manager of production for the Power Piping & Sprinkler Div. of Blaw-Knox Co.

James E. Overall, formerly with J. E. Sirrine Co. as senior instrumentation engineer, has joined the staff of Fischer & Porter Co. He will manage sales to the pulp and paper industry.

W. E. Roubie, for 11 years chief engineer for Jenssen Co., has been named to the engineering staff of Stebbins Engineering & Mfg. Co.

Eugene L. Martinez, manager of the Buffalo sales office, has been named Boston manager by Dow Chemical Co. He is being succeeded at Buffalo by **E. H. Killheffer Jr.,** formerly head of magnesium sales at New York, N. Y.

E. S. Fraser, formerly manager of Chicago Bridge & Iron Co.'s plant at Salt Lake City, Utah, has been named assistant general sales manager with headquarters in Chicago.

Henry S. Gilbert, a sales engineer with General Electric Co., has been named staff sales engineer by John W. Bolton & Sons Inc. and its Emerson Mfg. Co. Div.

Donald Williams, vice president and director of sales for Dow Chemical Co., has been appointed to the newly created position of director of corporate relations.

T. C. Clawson, Detroit branch manager, has been appointed assistant sales manager in the Central Div. office of Corn Products Sales Co.

Richard K. Dickson, formerly chief metallurgist at the home plant, has been made general manager of the new Fullerton, Cal. plant of Trent Tube Co. (Trent Tube is a wholly owned subsidiary of Crucible Steel Co. of America.)

Donald K. Ballman, general sales manager since 1949, has been promoted to the position of director of sales for Dow Chemical Co.

Bernard J. Koziol, formerly general manager of the Fibre Forming Div. of Arvey Corp., has rejoined Black-Clawson Co. as executive sales engineer for the Shartle Div. in Middletown, Ohio.

G. H. Olson, a vice president and a director of Link-Belt Speeder Corp. at Cedar Rapids, Iowa, has retired after 47 years of service.

Necrology . . .

Earl W. Tinker

Earl W. Tinker

Earl Warren Tinker, for 18 years executive secretary of the American Paper & Pulp Association, died recently in Rapid City, S. D. He had been vacationing in the Black Hills.

An authority on forestry policies and practices, Tinker joined the APPA staff in 1940. Last February, at the age of 66, he announced his retirement. It was to have taken effect this month.

In 1944 he was effective in organizing the Pulp & Paper Council to the United States Department of Commerce, the forerunner of similar councils from other industries.

In 1954 he was the United States pulp and paper representative to the United Nations Latin American meeting in Buenos Aires. Tinker was active in encouraging the industry's interest in the export market.

Prior to his service to pulp and paper, he served as the first head of the Division of State & Private Forestry in the United States Forest Service. Tinker was instrumental in organizing the salvaging of timber and the reduction of fire hazard following the New England hurricane of 1938.

Tinker joined the Forest Service in 1915 as forest assistant in the Black Hills. He was born in 1890 at Fenton, Mich.

Lewis L. Claflin

Lewis Leicester Claflin, 72, who had been associated with Erving Paper Mills in Erving, Mass., 41 years, died recently at a Groton hospital.

He served as treasurer, general sales manager and a director.

K. R. McBride Sr.

Karl R. McBride Sr., chairman of the board of Imperial Paper & Color Corp., died at his Glens Falls, N. Y. home recently at the age of 79.

McBride organized the company's color division in 1915. (Imperial Paper & Color is the world's largest producer of dry colors for paper and fabrics and is a major producer of wallpaper.)

He served as president from 1931 to 1953, when he became board chairman.

Morris Lesenger, president of Morris Paper Board Co. Inc. and of Berles Carton Co. Inc., both of Paterson, N. J., died recently after a long illness. He was 68.

John R. McConnell, former vice president and director of advertising of American Air Filter Co., died recently in Louisville, Ky. He was 69. He retired in 1956 after 33 years in the air filter industry, having joined Reed Engineering Co. in 1923.

Robert B. Goodman, a pioneer in modern forest management in the United States, died in September at a Marinette, Wis. hospital. He was 86.

Coming Events

Tappi

Oct. 23-24—Seventh Corrugated Containers Conference, Benjamin Franklin Hotel, Philadelphia

Nov. 6-8—Alkaline Pulping Conference, Francis Marion Hotel, Charleston, S. C.

Superintendents Association

Oct. 18-19—Pennsylvania-New Jersey-Delaware Div. (fall meeting), Pocono Manor, Pocono, Pa.

Oct. 22—Miami Valley Div.

Other Meetings

Oct. 21-25—45th Annual National Safety Congress & Exposition, Conrad Hilton Hotel, Chicago

Oct. 28-30—Packaging Institute, Annual Forum, Statler Hotel, New York, N. Y.

Oct. 28-31—Society of Industrial Packaging & Materials Handling Engineers, National Industrial Packaging & Handling Exposition of 1957, Atlantic City, N. J.

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PAPER INDUSTRY Whither? ..... In production, processes, new products, markets

Lignin for heavy-duty synthetic rubber tires

A tire tread formulation developed in the Division of Applied Chemistry of the National Research Council of Canada shows that lignin can be used to give longer life to tires, particularly to large-diameter tires used in military vehicles.

In exhaustive road tests carried out in Texas tires with synthetic rubber treads reinforced with lignin showed 15 per cent more resistance to wear than conventional tires.

A tire made of synthetic rubber reinforced with lignin develops less heat than a conventional synthetic rubber tire. It is because of the heat build-up in synthetic rubber that it has been necessary to incorporate a large proportion of natural rubber in a heavy-duty synthetic rubber tire. The new discovery may make it possible to develop a heavy-duty all-synthetic rubber tire.

Paper industry a wage leader

The average hourly wage increase received by the worker in the paper industry over the past 10 years was 84c as compared to 75c received by workers in all manufacturing industries over the same 10-year period, according to Wilbur M. McFeely, vice president of Riegel Paper Corp. McFeely ascribes the high level of wages in the paper industry to heavy capital investment and improved management methods.

Southern states produce 2,000,000 tons of chips from sawmill waste

The operation of more than 100 sawlog barkers in the southern states is now adding about 2,000,000 tons annually of high-quality bark-free chips to the southern pulpwood resoures. The installation of equipment for the conversion of sawmill waste into saleable chips is now considered standard procedure for medium and large sawmills.

The fight against the gypsy moth

Almost 3,000,000 acres of forest land in parts of New York, New Jersey and Pennsylvania were sprayed with DDT last summer with the view to eradicating the gypsy moth, which causes several million dollars of damage in northeastern areas each year.

Soda ash eliminated from recovery furnace exhaust gases

The installation of a Buffalo Forge stainless steel scrubber in series with the electrostatic precipitator at Mead Corp.'s Kingsport mill has resulted in a complete elimination of soda ash from the surrounding atmosphere. The problem of plugging of scrubber nozzles with soda ash was eliminated by the use of Calgon in the spray system.

if

you are making
a filled sheet—and

you would like to increase
the ash content, opacity
or brightness of your
finished paper without
increasing your usage
of fillers—or

you want to maintain
your present standards
while reducing usage
of clay and pigment—

THEN • • • we suggest you investigate the use of DARLING'S IMPROVED BONE GLUE as a wet end additive.

We've learned that every paper mill, including your own, is "different." That's why a cooperative mill trial is the best way to get a technical and economic evaluation.

Our Technical Service Representative would like to work with you in determining what can be accomplished in your mill. The cost of the glue and technical service are on us, so you've nothing to lose—much to gain. Arrangements can be made through your Darling Sales Representative. Or write, call, or wire us direct.

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GLUE DIVISION
4201 South Ashland Avenue • Chicago 9, Illinois

DARLING'S improved BONE GLUE

Lighter! Tighter!

LUNCOR PVC *VALVES*

Defy Corrosion!

FIG. 2601
SOCKET END
125 WP—140° F.

FIG. 2600
SCREWED END
125 WP—140° F.

Replace expensive high-alloy or glass-lined valves in your corrosive services with these money-saving, high-performance valves. Luncor is the first all-molded PVC valve designed and engineered by a valve manufacturer . . . and its low-cost performance is proved in handling most common corrosive solutions. Luncor Valves weigh only half as much as aluminum—one-sixth as much as bronze. Yet their high strength-weight ratio gives them rigidity comparable to metal. Luncor Valves are available in one-half inch through two inch sizes.

To list only a few . . . Luncor PVC Valves have established outstanding records for economy and service in the following operations:

- PAPER MILLS
- CHEMICAL PLANTS
- FOOD PROCESSING
- BEVERAGE BOTTLING
- PETROLEUM REFINING
- SUGAR REFINING
- WATER TREATMENT
- MARINE INSTALLATIONS

For detailed service recommendations . . . request a *Confidential Corrosion Service Information Form* from your Lunkenheimer Distributor, or from The Lunkenheimer Company, Box 360, Cincinnati 14, Ohio.

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